ASSESSMENT RESOURCE BOOK

WATER SUPPLY SYSTEM OPERATION & MAINTENANCE III

GREEN CLIMATE FUND

MNSDA

Ministry of Environment
Climate Change & Technology

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Instructions to the Assessor on Competency Based Assessment (CBA)

Assessment is the process of identifying a participant's current knowledge, skills and attitudes sets against all elements of competency within a unit of competency.

Suggested Assessment Methods
For each unit of competency, a number of assessment tools have been identified including:

- ✓ Work Projects
- ✓ Oral Questions
- ✓ Written Questions
- ✓ Third Party Statements
- ✓ Observation Checklists.

Instructions and Evidence Recording Sheets have been identified in this Assessment Manual for use by Assessors.

Alternative Assessment Methods
Whilst the above-mentioned assessment methods are suggested assessment methods, the assessor may use an alternate method of assessment taking into account:

a. The nature of the unit
b. The strengths of participants
c. The number of participants in the class
d. Time required to complete assessments
e. Time dedicated to assessment
f. Equipment and resources required.

Alternate assessment methods include:

- ✓ Practical demonstrations
- ✓ Practical demonstrations in simulated work conditions Problem solving
- ✓ Portfolios of evidence
- ✓ Critical incident reports
- ✓ Journals
- ✓ Oral presentations
- ✓ Interviews
- ✓ Videos
- ✓ Visuals/slides/audio tapes
- ✓ Case studies
- ✓ Log books
- ✓ Projects and Role plays
- ✓ Group projects
- ✓ Recognition of Prior Learning.

Whilst there is no specific instruction or evidence collection documents for all the alternative assessment methods, assessors can record competency in the „Other" section within the "Competency Recording Sheet".

Selection of Assessment Methods
Each assessor will determine the combination of Assessment Methods to be used to determine Competency for each Competency Unit on a student by student basis.
"Sufficient" evidence to support the „Competent"/"Not Yet Competent" decision must be captured.
In practice this means a minimum of two - three Assessment Methods for each candidate for each Competency Element is suggested.

At least one method should provide evidence of practical demonstration of competence.

The following assessment methods deemed to provide evidence of practical demonstration of competence include:

- ✓ Practical Work Projects
- ✓ Third Party Statement
- ✓ Observation Checklist.

Assessing Competency
Competency based assessment does not award grades, but simply identifies if the participant has the knowledge, skills and attitudes to undertake the required task to the specified standard.

Therefore, when assessing competency, an assessor has two possible results that can be awarded:

- ✓ "Competent" (C)
- ✓ "Not Yet Competent (NYC)

Competent (C)
If the participant is able to successfully answer or demonstrate what is required, to the expected standards of the performance criteria, they will be deemed as "Competent" (C).

The assessor will award a "Competent" (C) if they feel the participant has the necessary knowledge, skills and attitudes in all assessment tasks for a unit.

Not Yet Competent' (NYC)
If the participant is unable to answer or demonstrate competency to the desired standard, they will be deemed to be „Not Yet Competent" (NYC).

This does not mean the participant will need to complete all the assessment tasks again. The focus will be on the specific assessment tasks that were not performed to the expected standards.

The participant may be required to:

a. Undertake further training or instruction
b. Undertake the assessment task again until they are deemed to be "Competent".

Trade Testing (Recognition of Prior Learning)

Trade Testing or Recognition of Prior Learning is the process that gives current industry professionals who do not have a formal qualification, the opportunity to benchmark their extensive skills and experience against the standards set out in each unit of competency/subject.

This process is a learning and assessment pathway which encompasses:

- ✓ Recognition of Current Competencies (RCC)
- ✓ Skills auditing
- ✓ Gap analysis and training
- ✓ Credit transfer.

Code of practice for assessors

This Code of Practice provides:

- ✓ Assessors with direction on the standard of practice expected of them
- ✓ Candidates with assurance of the standards of practice expected of assessors
- ✓ Employers with assurance of the standards maintained in the conduct of assessment.

The Code detailed below is based on the available international code of ethics and practice.

- ✓ The differing needs and requirements of the person being assessed, the local enterprise and/or industry are identified and handled with sensitivity
- ✓ Potential forms of conflict of interest in the assessment process and/or outcomes are identified and appropriate referrals are made, if necessary
- ✓ All forms of harassment are avoided throughout the planning, conducting, reviewing and reporting of the assessment outcomes
- ✓ The rights of the candidate are protected during and after the assessment
- ✓ Personal and interpersonal factors that are not relevant to the assessment of competency must not influence the assessment outcomes
- ✓ The candidate is made aware of rights and process of appeal
- ✓ Evidence that is gathered during the assessment is verified for validity, reliability, authenticity, sufficiency and currency
- ✓ Assessment decisions are based on available evidence that can be produced and verified by another assessor
- ✓ Assessments are conducted within the boundaries of the assessment system policies and procedures
- ✓ Formal agreement is obtained from both the candidate and the assessor that the assessment was carried out in accordance with agreed procedures
- ✓ The candidate is informed of all assessment reporting processes prior to the assessment
- ✓ The candidate is informed of all known potential consequences of decisions arising from an assessment, prior to the assessment
- ✓ Confidentiality is maintained regarding assessment results
- ✓ The assessment results are used consistently with the purposes explained to the candidate
- ✓ Opportunities are created for technical assistance in planning, conducting and reviewing assessment procedures and outcomes.

Instructions and checklist for assessors

Instructions

General instructions for the assessment

- ✓ Assessment should be conducted at a scheduled time that has been notified to the candidate
- ✓ Facilitators must ensure participants are made aware of the need to complete assessments and attend assessment sessions
- ✓ If a participant is unable to attend a scheduled session, they must make arrangements with the Assessor to undertake the assessment at an alternative time
- ✓ At the end of the assessment the Assessor must give feedback and advise the participant on their C/NYC status
- ✓ Complete the relevant documentation and submit to the appropriate department.

Preparation

- ✓ Gain familiarity with the Unit of Competency, Elements of Competency and the Performance Criteria expected
- ✓ Study details assessment documentation and requirements
- ✓ Brief candidate regarding all assessment criteria and requirements.

Briefing Checklist

- ✓ Begin the assessment by implementing the following checklist and then invite the candidate to proceed with assessment.

Checklist for Assessors

#	Activity to Follow	Tick	Remarks
	Prior to the assessment I have:		
1	Ensured the candidate is informed about the venue and schedule of assessment.		
2	Received current copies of the performance criteria to be assessed, assessment plan, evidence gathering plan, assessment checklist, appeal form and the company's standard operating procedures (SOP).		
3	Reviewed the performance criteria and evidence plan to ensure I clearly understood the instructions and the requirements of the assessment process.		
4	Identified and accommodated any special needs of the candidate.		
5	Checked the set-up and resources for the assessment.		
	During the assessment I have:		
6	Introduced myself and confirmed identities of candidates.		
7	Put candidates at ease by being friendly and helpful.		
8	Explained to candidates the purpose, context and benefits of the assessment.		
9	Ensured candidates understood the assessment process and all attendant procedures.		
10	Provided candidates with an overview of performance criteria to be assessed.		
11	Explained the results reporting procedure.		
12	Encouraged candidates to seek clarifications if in doubt.		
13	Asked candidates for feedback on the assessment		
14	Explained legal, safety and ethical issues, if applicable.		
	After the assessment I have:		
14	Ensured candidate is given constructive feedback.		
16	Completed and signed the assessment record.		
17	Thanked candidate for participating in the assessment.		

Instructions for recording competency

Specifications for Recording Competency

The following specifications apply to the preparation of Evidence Gathering Plans:

- ✓ A Competency Recording Sheet must be prepared for each candidate to ensure and demonstrate all Performance Criteria and Competency Elements are appropriately assessed. This Sheet indicates how the Assessor will gather evidence during their assessment of each candidate
- ✓ This Competency Recording Sheet is located at the end of the Assessment Plan It is the overriding document to record competency
- ✓ Assessor may vary the Competency Recording Sheet to accommodate practical and individual candidate and/or workplace needs
- ✓ Assessor must place a tick (☒) in the „Assessment Method" columns to identify the methods of assessment to be used for each candidate
- ✓ Multiple Competency Elements/Performance Criteria may be assessed at the one time, where appropriate

- ✓ The assessor and participant should sign and date the Competency Recording Sheet, when all forms of evidence and assessment have been completed
- ✓ The assessor may provide and feedback or clarify questions which the participant may have in regards to the assessment grade or findings
- ✓ All documents used to capture evidence must be retained, and attached to the Competency Recording Sheet for each candidate for each Competency Unit.

Instructions for different assessment methods

Specifications for Work Project Assessment

These guidelines concern the use of work projects.
The work projects identified in the Training Manuals involve a range of tasks, to be performed at the discretion of the Assessor.
Work project tasks can be completed through any form of assessment as identified in the Trainer and Trainee Manuals and stated at the start of this section.
Assessors should follow these guidelines:

- ✓ Review the Work Projects at the end of each „Element of Competency" in the Trainee Manual to ensure you understand the content and what is expected
- ✓ Prepare sufficient resources for the completion of work activities including:
  - Time – whether in scheduled delivery hours or suggested time participants to spend outside of class hours
  - Resources – this may involve technical equipment, computer, internet access, stationery and other supplementary materials and documents

- ✓ Prepare assessment location (if done in class) making it conducive to assessment
- ✓ Explain Work Projects assessment to candidate, at the start of each Element of Competency. This ensures that participants are aware of what is expected and can collate information as delivery takes place.
- ✓ Assessors can use the following phrase as a guide (where an „X" is identified, please input appropriate information):

  "At the end of each Element of Competency there are Work Projects which must be completed. These projects require different tasks that must be completed.
  These work projects are part of the formal assessment for the unit of competency titled X.

  - ➢ You are required to complete these activities:
    - Using the 'X' method of assessment.
    - At 'X' location
    - You will have 'X time period' for this assessment.
  - ➢ You are required to compile information in a format that you feel is appropriate to the assessment.
  - ➢ Do you have any questions about this assessment?"
- ✓ Commence Work Project assessment:
- ✓ The assessor may give time for participants to review the questions at this time to ensure they understand the nature of the questions. The assessor may need to clarify questions.
- ✓ Participants complete work projects in the most appropriate format

- ✓ Participants must submit Work Project evidence to the assessor before the scheduled due date
- ✓ Assessor must assess the participant's evidence against the competency standards specified in each Element of Competency and their own understanding. The assessor can determine if the participant has provided evidence to a "competent" standard.
- ✓ Transcribe results/details to Competency Recording Sheet
- ✓ Forward/file assessment record.

Specifications for Oral Question Assessment

These guidelines concern the use of oral questioning. Assessors should follow these guidelines.

- ✓ Prepare Assessment Record for Oral Questioning. One record for each candidate:
  - Enter Student name
  - Enter Assessor name
  - Enter Location

- ✓ Familiarize self with Questions to be asked
- ✓ Prepare assessment location (table and chairs) making it conducive to assessment
- ✓ Explain Oral Questioning assessment to candidate, using the following phrase as a guide (where a "X" is identified, please input appropriate information):
  "These oral questions are part of the formal assessment for the unit of competency titled X.
  There are X questions and you are required to answer all of them to the best of your ability and I will record whether or not you have answered correctly.
  - I will give you feedback at the end of the assessment.
  - Do you have any questions about this assessment?"

- ✓ Commence Oral Questioning assessment
- ✓ Complete Assessment Record for the Oral Questioning by:
  - Ticking C or NYC, as appropriate
  - Entering „Remarks" as required
  - Completing Oral Questioning within 60 minutes

- ✓ Complete Oral Questioning and provide feedback to candidate
- ✓ Transcribe results/details to Competency Recording Sheet
- ✓ Forward/file assessment record.

Specifications for Written Question Assessment

These guidelines concern the use of written questioning.
Assessors should follow these guidelines.

- ✓ Familiarize self with Questions and Answers provided.
- ✓ Print and distribute copies of „Written Questions" for participants. Ideally this should take place with adequate time for participants to answer all questions before the expected due date.
- ✓ Explain Written Questioning assessment to candidate, using the following phrase as a guide (where a „X" is identified, please input appropriate information):

  "These written questions are part of the formal assessment for the unit of competency titled X.
  There are X questions and you are required to answer all of them to the best of your ability.

You may refer to your subject materials, however where possible try to utilise your existing knowledge when answering questions.
Where you are unsure of questions, please ask the Assessor for further instruction. This may be answering the question orally or asking the assessor to redefine the question.
We have X time for this assessment.

- The due date for completion of this assessment is X
- On this date you must forward the completed questions to the assessor by X time on the date of X
- Do you have any questions about this assessment?"

- ✓ The assessor may give time for participants to review the questions at this time to ensure they understand the nature of the questions. The assessor may need to clarify questions. Participants may record written answers (where possible)
- ✓ Participants must submit the written answers to the assessor before the scheduled due date
- ✓ Assessor must assess the participant's written answers against the model answers provided as a guide, or their own understanding. The assessor can determine if the participant has answered the questions to a "competent" standard.
- ✓ Transcribe results/details to Competency Recording Sheet
- ✓ Forward/file assessment record.

Specifications for Observation Checklist

These specifications apply to the use of the Observation Checklist in determining competency for candidates.
Only an approved assessor is authorized to complete the Observation Checklist.
The assessor is required to observe the participant, ideally in a simulated environment or their practical workplace setting and record their performance (or otherwise) of the competencies listed on the Observation Checklist for the Competency Unit.
To complete the Observation Checklist the Assessor must:

- ✓ Insert name of candidate
- ✓ Insert assessor name
- ✓ Insert identify of location where observations are being undertaken
- ✓ Insert date/s of observations – may be single date or multiple dates
- ✓ Place a tick in either the „Yes" or „No" box for each listed Performance Criteria to indicate the candidate has demonstrated/not demonstrated that skill
- ✓ Provide written (and verbal) feedback to candidate – as/if appropriate Sign and date the form
- ✓ Present form to candidate for them to sign and date
- ✓ Transcribe results/details to Competency Recording Sheet for candidate
- ✓ Forward/file Observation Checklist.

This source of evidence combines with other forms of assessment to assist in determining the "Competent" or "Not Yet Competent" decision for the participant.

Specifications for Third Party Statement

These specifications relate to the use of a relevant workplace person to assist in determining competency for candidates.
The Third-Party Statement is to be supplied by the assessor to a person in the workplace who supervises and/or works closely with the participant.
This may be their Supervisor, the venue manager, the Department Manager or similar.
The Third-Party Statement asks the Supervisor to record what they believe to be the competencies of the participant based on their workplace experience of the participant. This

experience may be gained through observation of their workplace performance, feedback from others, inspection of candidate's work etc.
A meeting must take place between the Assessor and the Third Party to explain and demonstrate the use of the Third-Party Statement.
To complete the Third-Party Verification Statement the Assessor must:

- ✓ Insert candidate name
- ✓ Insert name and contact details of the Third Party
- ✓ Tick the box to indicate the relationship of the Third Party to the candidate
- ✓ Present the partially completed form to the Third Party for them to finalize
- ✓ Collect the completed form from the Third Party
- ✓ Transcribe results/details to Competency Recording Sheet for candidate Forward/file Third Party Statement.

The Third Party must:

1. Record their belief regarding candidate ability/competency as either:
    - Competent = Yes
    - Not Yet Competent = No
    - Unsure about whether candidate is competent or not = Not Sure
2. Meet briefly with the assessor to discuss and/or clarify the form.

    This source of evidence combines with other forms of assessment to assist in determining the „Competent" or "Not Yet Competent" decision for the candidate.

    A separate Third-Party Statement is required for each Competency Unit undertaken by the candidate.

Unit-1: Apply Occupational Health and Safety requirements

Unit No	01
Unit Title	Apply Occupational Health and Safety requirements
Unit Code	**CONCM04V1/21**

Evidence Matrix

Following matrix is developed using which the Assessment will be planned and undertaken.

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Clean work preparation areas							
Clean preparation areas using appropriate cleaning agents and equipment according to workplace procedures	✓	✓		✓	✓		✓
Remove spillages using appropriate agents, personal protective equipment (PPE) and workplace procedures	✓		✓	✓	✓	✓	
Collect and segregate wastes in accordance with workplace procedures, relevant codes and regulations	✓	✓	✓	✓		✓	✓
2. Clean and store equipment							
Collect used equipment, inspect for faults and, where necessary, remove from service	✓		✓	✓		✓	✓
Use appropriate agents, apparatus and techniques to clean equipment	✓	✓		✓	✓		✓
Store clean equipment in the designated locations and manner	✓	✓	✓		✓	✓	
3. Monitor stocks of materials and equipment							
Perform stock checks and maintain records of usage as directed	✓	✓	✓		✓	✓	✓
Store labelled stocks for safe and efficient retrieval	✓		✓	✓	✓		✓
Inform appropriate personnel of impending stock shortages to maintain continuity of supply	✓	✓		✓	✓	✓	✓
4. Maintain a safe work environment							
Participate in OHS activities within scope of responsibilities	✓	✓	✓	✓	✓	✓	✓
Use established safe work practices and PPE to ensure personal safety and that of other personnel			✓	✓	✓	✓	✓
Report potential hazards and/or maintenance issues in own work area to designated personnel	✓	✓	✓		✓		✓
Minimise the generation of waste and environmental impacts	✓	✓	✓	✓		✓	
Dispose of waste in accordance with workplace procedures, relevant codes and regulations	✓		✓	✓	✓	✓	✓

5. Follow incident and emergency response procedures							
Identify incident and emergency situations	✓		✓	✓	✓		✓
Report and record incident and emergency situations according to workplace procedures	✓	✓		✓	✓	✓	
Follow incident and emergency procedures as appropriate to the nature of emergency using emergency equipment according to workplace procedures	✓		✓		✓		✓
6. Determine Occupational Health and Safety (OH&S) issues relating to immediate work environment							
Occupational Health and Safety issues in the immediate workplace are assessed and action to rectify the problem is taken or reported to supervisor	✓	✓	✓	✓	✓	✓	✓
Understand the aspects of First aid	✓		✓	✓			✓
Understand the aspects of Fire Respond	✓	✓	✓	✓		✓	✓
Workplace and OH&S procedures are followed to ensure safe working environment	✓	✓		✓	✓	✓	
Occupational Health and Safety documents are provided to all work stations, this should include a list of personal safety items based on the line of work	✓	✓	✓		✓	✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play

1. Written questions

#	Questions	Answers
1	Why is it important to keep the work area clean?	A messy workshop hampers productivity, can be extremely hazardous and could cause long term health and safety problems.
2	Name three equipment that are used to clean the workshop area.	• Pressure cleaners • Sweepers • Vacuum cleaners
3	What is a polisher used for?	A polisher is used to turn a dirty hard floor to a brand new in a timely fashion
4	How should hazardous waste be stored?	It should be stored under cover and in a bunded and secure area, or in an underground tank.
5	What is stock checking?	Stock checking, is the systematic process of checking the quantity of the inventory.
6	Why is it important to label stocks?	Stock items need to be properly labelled for easy retrieval as confusions may arise if the labels are not properly undertaken.
7	Name 3 key points of ladder safety	• the ladder should be checked for safety and for visible signs of damage each time it is used – if in any doubt the ladder should not be used • care must be taken when transporting the ladder around site and when erecting it • the ladder must only be used on firm, level ground

8	What are the categories for hazardous substances?	1. toxic 2. harmful 3. corrosive 4. irritant 5. extremely flammable 6. oxidizing
9	Why is PPE worn?	To minimize exposure to hazards that cause serious workplace injuries and illnesses
10	Name 3 equipment's used for eye protection	1. Safety glasses 2. Safety goggles 3. Welding goggles
11	What is the reporting procedure when an accident occurs in workplace?	If an accident occurs, an employee may be required to complete an accident report form; this should preferably be completed by the injured employee as soon after the accident as possible. If it is completed by a third party, then the employee must carefully check that the details are a clear identification of the events that took place, as once signed, an accident report could be used in legal proceedings
12	What is Workplace health and safety?	Safety of workers (also known as worker safety and occupational health and safety) refers to the provision of a safe working environment, safe equipment, policies, and procedures in order to ensure workers' health and safety.
13	What are the classes of Fire?	1. Class A - fires involving solid materials, extinguished by water 2. Class B – fires involving flammable liquids, extinguished by foam or carbon dioxide 3. Class C – fires involving flammable gases, extinguished by dry powder 4. Class D – fires involving flammable metals, extinguished by dry powder.
14	Name 3 types of fire extinguisher	• Water • Foam • Carbon dioxide

2. PT=Practical Test

#	Questions	Answers
1	Follow incident and emergency response procedures	Every student is expected to identify incident and emergency situation presented to them. Identify and analyze the risk, and consider potential consequences in terms of exposure and hazard and likelihood of each The students must be able to follow incident and emergency procedures as appropriate to the nature of emergency using emergency equipment.

2	Demonstrate the basic aspects of First aid	Students must identify the requirements for providing first aid and understands the typical contents of a first aid kit. Students are able distinguish the different treatments for electrical shock, treatments for burns, dealing with broken bones, treatment for foreign bodies in the eye.
3	Demonstrate the basic aspects of Fire Respond	Students understands different classes of fire and firefighting equipment's The students are able to take appropriate actions in the event of a fire. • Fire escape routes from the building • The location of designated safe fire assembly points • Raise the fire alarm • Leave by nearest exit • Ensure the emergency service is summoned

3. OW =Observation at work Place

#	Types of Skills	Techniques for validation
1	Scientific terminologies and technical details of sampling, testing, equipment and instrumentation	✓ Accuracy of the information shared ✓ Relevancy of the information ✓ Application of different knowledge to relevant situations
2	Principles of small –scale budgeting, operational planning and efficient resource use	✓ Accuracy of the information shared ✓ Relevancy of the information ✓ Application of different knowledge to relevant situations
3	Career Awareness	✓ From the information shared, validate the presenter is aware of the different career opportunities available across the Water Sanitation sector of the Maldives

4. OQ=Oral Questioning

#	Types of Skills	Techniques for validation
1	Clean work preparation areas	✓ Clean preparation areas using appropriate cleaning agents and equipment according to workplace procedures ✓ Remove spillages using appropriate agents, personal protective equipment (PPE) and workplace procedures ✓ Collect and segregate wastes in accordance with workplace procedures, relevant codes and regulations
2	Clean and store equipment	✓ Collect used equipment, inspect for faults and, where necessary, remove from service ✓ Use appropriate agents, apparatus and techniques to clean equipment ✓ Store clean equipment in the designated locations and manner
3	Monitor stocks of materials and equipment	✓ Perform stock checks and maintain records of usage as directed ✓ Store labelled stocks for safe and efficient retrieval

		✓ Inform appropriate personnel of impending stock shortages to maintain continuity of supply
4	Maintain a safe work environment	✓ Participate in OHS activities within scope of responsibilities ✓ Use established safe work practices and PPE to ensure personal safety and that of other personnel ✓ Report potential hazards and/or maintenance issues in own work area to designated personnel ✓ Minimise the generation of waste and environmental impacts ✓ Dispose of waste in accordance with workplace procedures, relevant codes and regulations
5	Follow incident and emergency response procedures	✓ Identify incident and emergency situations ✓ Report and record incident and emergency situations according to workplace procedures ✓ Follow incident and emergency procedures as appropriate to the nature of emergency using emergency equipment according to workplace procedures
6	Determine Occupational Health and Safety (OH&S) issues relating to immediate work environment	✓ Occupational Health and Safety issues in the immediate workplace are assessed and action to rectify the problem is taken or reported to supervisor ✓ Understand the aspects of First aid ✓ Understand the aspects of Fire Respond ✓ Workplace and OH&S procedures are followed to ensure safe working environment ✓ Occupational Health and Safety documents are provided to all work stations, this should include a list of personal safety items based on the line of work.

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc.

		Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-2: Apply work ethics and optimize professionalism

Unit No	02
Unit Title	Apply work ethics and optimize professionalism
Unit Code	**CONCM01V2/20**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Define the purpose of work							
One's unique sense of purpose for working and the whys of work are identified, reflected on and clearly defined for one's development as a person and as a member of society.	✓	✓		✓	✓	✓	
Personal mission is in harmony with company's values.	✓		✓	✓	✓		✓
2. Apply work values/ethics							
Work values/ethics/concepts are identified and classified in accordance with companies' ethical standard guidelines.	✓			✓	✓		✓
Work policies are undertaken in accordance with company's policies, guidelines on work ethical standard.	✓	✓	✓	✓	✓	✓	✓
Resources are used in accordance with company's policies and guidelines.	✓	✓	✓		✓	✓	
Punctuality, absence from work, sick, family and annual leave is maintained alignment to the Employment Act of the Maldives		✓		✓	✓		✓
3. Deal with ethical problems							
Company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct/behavior are followed.	✓	✓	✓	✓		✓	✓
Work incidents/situations are reported according to company protocol/guidelines.	✓	✓	✓	✓	✓	✓	✓
Resolution and/or referral of ethical problems identified are reported/documented based on standard operating procedure	✓		✓	✓	✓		✓
4. Maintain integrity of conduct in the workplace							
Personal behavior and relationships with co-workers and/or clients are demonstrated consistent with ethical standards, policy and guidelines.	✓	✓	✓	✓	✓	✓	✓

Work practices are satisfactorily demonstrated and consistent with industry work ethical standards, organizational policy and guidelines.	✓	✓	✓	✓		✓	
Instructions to co-workers are provided based on ethical lawful and reasonable directives	✓	✓		✓	✓	✓	✓
5. Contribute to workplace efficiency and delivery of quality service							
Prioritize work load according to level of responsibility	✓	✓	✓	✓	✓	✓	✓
Advise supervisor if additional resources or support are required to improve performance	✓	✓		✓	✓		✓
Undertake duties in a positive manner to enhance workplace cooperation and efficiency	✓	✓	✓		✓	✓	
Monitor and adjust work practices to ensure that quality of outputs is maintained	✓	✓	✓	✓		✓	✓
Identify and report opportunities for improvements in procedures, processes and equipment in work area	✓	✓	✓	✓		✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play

1.Written questions

#	Question	Answer
1	Define work ethics and professionalism.	The capacity to demonstrate personal accountability and effective work habits, such as punctuality, working productively with others, and time workload management, and understand the impact of non-verbal communication on professional work image.
2	Identify four work values/ethics	1. Reliability 2. Dedication 3. Discipline 4. Productivity 5. Cooperation 6. Integrity 7. Responsibility 8. Professionalism
3	Briefly explain four work values/ethics.	**Reliability** Employees with a strong work ethic are very reliable. You can expect these individuals to be on time for shifts and meetings. They meet their deadlines and offer quality work. A reliable coworker makes an excellent teammate because they contribute fairly to projects. **Dedication** Part of a good work ethic is commitment and dedication to the job. They know how to focus on tasks without being distracted. These employees usually work until they finish their duties. They stay with one company for long periods of time. **Discipline** Discipline is an essential part of showing a good work ethic. Highly disciplined employees show determination and commitment to the job. They strive to meet or exceed expectations and seek opportunities to learn new skills and improve their performance. **Productivity** A strong work ethic translates to outstanding productivity. Productive employees often have a higher output than their counterparts. They complete projects early and do more than the minimum requirements. **Cooperation** A good work ethic is something that employees often spread to those around them by cooperating willingly on projects. They show good teamwork and readily assist others when needed.
4	What are some techniques to improve work values/ethic skills?	1. Act as an ambassador of the company 2. Prioritize your professional responsibilities 3. Seek professional development 4. Review your work **5.** Show respect to others
5	Briefly explain some techniques that can be used to improve	**Act as an ambassador of the company** Maintain a positive attitude toward the company in both professional and personal interactions. Seek ways to further the

	work values/ethic skills.	business even if they're outside the scope of your job. For example, a finance professional may pass a potential lead along to a sales representative. **Prioritize your professional responsibilities** Maintain good attendance, return promptly from lunch and arrive for meetings early. Strive to make personal appointments that don't interfere with your work schedule and only take personal calls on your cell phone when you're at lunch. **Seek professional development** Independently seek ways to improve your work performance, such as taking night classes, attending weekend seminars or reading industry publications. **Review your work** Submit thorough work that you have double-checked for quality and consistency. Manage your time properly so you can deliver projects early and give each task the time and attention it requires. **Show respect to others** Speak politely to and about others in the workplace. Keep your interactions professional to show your respect for others.
6	Identify five common ethical problems.	1. Unethical leadership 2. Toxic workplace culture 3. Discrimination and harassment 4. Unrealistic and conflicting goals 5. Questionable use of company technology 6. Too frequent coffee or cigarette breaks
7	Briefly explain three common ethical problems.	**Unethical leadership** Having a personal issue with your boss is one thing, but reporting to a person who is behaving unethically is another. This may come in an obvious form, like manipulating numbers in a report or spending company money on inappropriate activities; however, it can also occur more subtly, in the form of bullying, accepting inappropriate gifts from suppliers, or asking you to skip a standard procedure just once. **Toxic workplace culture** Organizations helmed by unethical leadership are more often than not plagued by a toxic workplace culture. Leaders who think nothing of taking bribes, manipulating sales figures and data or pressuring employees or business associates for "favors" (whether they be personal or financial), will think nothing of disrespecting and bullying their employees. With the current emphasis in many organizations to hire for "cultural fit," a toxic culture can be exacerbated by continually repopulating the company with like-minded personalities and toxic mentalities. **Discrimination and harassment** Laws require organizations to be equal employment opportunity employers. Organizations must recruit a diverse workforce, enforce policies and training that support an equal opportunity program, and foster an environment that is respectful of all types of people. Unfortunately, there are still many whose practices

		break with existing guidelines. When discrimination and harassment of employees based on race, ethnicity, gender, disability or age occurs, not only has an ethical line been crossed but a legal one as well. **Unrealistic and conflicting goals** Your organization sets a goal—it could be a monthly sales figure or product production number—that seems unrealistic, even unattainable. While not unethical in and of itself (after all, having driven leadership with aggressive company goals is crucial to innovation and growth), it's how employees, and even some leaders, go about reaching the goal that could raise an ethical red flag. Unrealistic objectives can spur leaders to put undue pressure on their employees, and employees may consider cutting corners or breaching ethical or legal guidelines to obtain them. Cutting corners ethically is a shortcut that rarely pays off, and if your entire team or department is failing to meet goals, company leadership needs that feedback to revisit those goals and re-evaluate performance expectations.
8	Briefly explain three methods on dealing with ethical issues at workplaces.	**Gather as much information as possible** Before taking action to solve an ethical issue, we need to have thorough understanding of that issue as possible. The problem may not be as straightforward as it first appears and it is important to gather enough information to determine what's going on. Gather all relevant facts concerning the issue at hand, and ensure we are not making assumptions. Everyone has their own personal and professional biases. Some of those biases are grounded in experience, but with limited facts or information, it could be skewed to perspectives and be lacking reality. **Identify the parties involved** Identify the parties involved and determine who else is involved in this issue. Involvement can be direct or indirect and on a direct level, those participating in the ethical violation are certainly involved. On an indirect level, those who will be impacted regardless of having no say in the issue are also involved. Among others, this can include coworkers, customers, and stockholders. It is important to determine who, among those involved. While fixing the issue, ensure the case is within your scope of duty and if not refer to the relevant seniors within the organization. **Pinpoint the ethical issues involved** Instead of settling for a general sense that something is wrong, you need to ask yourself which ethical principles are being abused. Some ethical violations are more obvious than others. For instance, if you caught a coworker stealing expensive equipment, you could make the clear distinction that theft is wrong. In situations dealing with small violations or interdepartmental strife, though, the violation may not be as clear. Review the circumstances again and ask yourself which fundamental principle is affected. Possible options include violations of power, integrity, honesty, objectivity, professional competence, confidentiality, or fairness.

		Review the company's standard procedure Find out if your company currently has an internal system set up for dealing with ethical issues like this. If you have a company manual or similar documentation, review it now. Look into the organization's policies concerning workplace ethics. Pay close attention to the chain of command. Find out who you should involve at which points, and the correct procedure for doing so. If the company doesn't have a set structure for dealing with ethical issues, you will need to determine who to go to using your own experience and understanding. **List and evaluate your options** Think of every possible option available to you instead of settling for the most obvious. Write out each of these options and consider the impact each one might have. When evaluating your options, consider how each one fares in the light of your company's internal procedures, any external laws involved, and any general ethical values upheld by society as a whole. Predict the consequences that will result from each option. This includes both positive and negative outcomes. Understand that, in some circumstances, each option may come with both negative and positive consequences. Etc.
9	Define professional integrity	Professional integrity is the practice of maintaining appropriate ethical behavior. It is the practice of showing strong adherence to moral and ethical principles and values such as honesty, honor, dependability and trustworthiness.
10	Identify three reasons for maintaining professional integrity.	✓ Employee satisfaction ✓ Reputation ✓ Clearer focus ✓ Stronger sales
11	Briefly explain three reasonsfor maintaining professional integrity	**Employee satisfaction**: Employees are typically happier working for someone who they believe is trustworthy and dependable, someone who would never ask them to compromise their own principles. Integrity in a supervisor has been linked to job satisfaction and engagement, employee health and even life satisfaction. **Reputation**: In order for people to trust you—both in- and outside of your organization—you need to behave with integrity. Investors need to trust you in order to consider investing in your business. Vendors need to trust that you will pay for goods and services. Maintaining professional integrity will allow you to build a strong reputation that will increase the trust and comfort others have in doing business with you **Clearer focus**: Consistently behaving with professional integrity means you have the energy to focus on what is important rather than wasting energy covering up bad practice.

		Stronger sales: Customers today are motivated to buy from companies that are socially and environmentally responsible. The most effective way to create a culture of integrity and ethical behavior is to behave with professional integrity.
12	Identify the skills that should be developed when maintaining integrity in the workplace.	1. Treat everyone the same 2. Reward honesty 3. Admit your mistakes 4. Encourage teams to speak freely 5. Conduct self-assessments 6. Keep your commitments 7. Put in maximum effort
13	Briefly explain four skills that should be developed when maintaining integrity in the workplace.	**1. Treat everyone the same** Integrity is about honesty, wholeness and being the same person in all situations and with all people. Treat supervisors, coworkers and even the intern with the same level of professionalism and respect, regardless of their level of seniority. The same applies to customers. Every customer should be given the best treatment, regardless of the level of service they pay for. **2. Reward honesty** Create a culture of integrity by encouraging others to be honest with you, even when they make costly mistakes. Reward honesty publicly and repeatedly until everyone on your team understands that it's always safe—and always the best idea—to be honest with you. **3. Admit your mistakes** Everyone makes mistakes and no one, from customers to employees, expects everyone to be perfect all the time. The key to behaving with professional integrity is admitting mistakes and apologizing when you're wrong. You must also demonstrate your regret through your actions and demeanor. You'll generally find that not only do people not think less of you, they actually think more highly of you by your ability to admit error. **4. Encourage teams to speak freely** Encourage your team to come up with fresh and creative approaches to everyday business challenges you encounter. Team discussions regarding new ideas should be honest and critical, yet respectful and open-minded of other perspectives. Encourage your team to speak freely as well as give and receive constructive criticism to improve ideas. **5. Conduct self-assessments** Periodically evaluate whether you are behaving with professional integrity. Evaluate whether you are heavily influenced by stronger personalities, pressured by your boss or tempted by easy money. You could even ask a trusted coworker their objective viewpoint. Make a non-judgmental inventory of your own integrity and determine whether you need to take action based on potential areas of self-improvement. Etc.

14	What are the three components of excellent service quality	1. Great Service climate 2. Service strategy 3. Service Performance

1. PT=Practical Test

#	Activity	Assessment scope
1	**Presentation** on "Importance of Work and Plans for Career Development"	Asses the presentation on the following. ✓ Reason for work is explained ✓ Proper knowledge of the career expressed ✓ Plans for self-development and pathways for career advancement is explained
2	**Role Play** on application of work values/ethic	Asses the role play and observe the following ✓ Participant understands the concepts related to work values and ethics ✓ Reviewed roles of different occupations within company and explain good practices related to performing work ✓ Revisit the existing company policies and interpreted meaning of these policies including Do's and Do Nots of these policies ✓ Interpret good employee attributes related to handling of punctuality, absence from work, sick, family and annual leave
3	**Assignment** focused on managing an ethical problem within the workplace with steps to manage the problem with application of integrity.	Students will be given assignment where they will be asked to identify and select an ongoing ethical problem, analyse it and detail the steps to manage the problem with applications of honesty and integrity within the workplaces.

2. OW =Observation at work Place

#	Observation activity	Points to validate
1	**Presentation** on "Importance of Work and PlansforCareer Development"	Use the presentation and assess the following ✓ Purpose for working and the why's of work are identified, reflected and linked to self-development
2	**Role Play** on application of work values/ethic	Observe the role play and validate if the students are aware of the following ✓ Work policies are undertaken in accordance with company's policies. ✓ Resources are used in accordance with company's policies and guidelines.

3	**Assignment** focused on managing an ethical problem within the workplace with steps to manage the problem with application of integrity.	Check the assignment and observe the following ✓ Work incidents/situations are identified and reported according to company guidelines ✓ Personal behavior and relationships with co-workers and clients are within ethical standard ✓ Work practices are maintained within ethical boundaries for sustained integrity at workplace.

3. OQ=Oral Questioning

#	Questions	Validating Student Performance
1	Define the purpose of work	Make sure the students answer questions related to the following areas ✓ One's unique sense of purpose for working and the whys of work are identified, reflected on and clearly defined for one's development as a person and as a member of society. ✓ Personal mission is in harmony with company's values.
2	Apply work values/ethics	Make sure the students answer questions related to the following areas ✓ Work values/ethics/concepts are identified and classified in accordance with companies' ethical standard guidelines. ✓ Work policies are undertaken in accordance with company's policies, guidelines on work ethical standard. ✓ Resources are used in accordance with company's policies and guidelines. ✓ Punctuality, absence from work, sick, family and annual leave is maintained alignment to the Employment Act of the Maldives
3	Deal with ethical problems	Make sure the students answer questions related to the following areas ✓ Company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct/behavior are followed. ✓ Work incidents/situations are reported according to company protocol/guidelines. ✓ Resolution and/or referral of ethical problems identified are reported/documented based on standard operating procedure
4	Maintain integrity of conduct in the workplace	Make sure the students answer questions related to the following areas

		✓ Personal behavior and relationships with coworkers and/or clients are demonstrated consistent with ethical standards, policy and guidelines ✓ Work practices are satisfactorily demonstrated and consistent with industry work ethical standards, organizational policy and guidelines. ✓ Instructions to co-workers are provided based on ethical lawful and reasonable directives
5	Contribute to workplace efficiency and delivery of quality service	Make sure the students answer questions related to the following areas ✓ Prioritize work load according to level of responsibility ✓ Advise supervisor if additional resources or 15 support are required to improve performance ✓ Undertake duties in a positive manner to enhance workplace cooperation and efficiency ✓ Monitor and adjust work practices to ensure that quality of outputs is maintained ✓ Identify and report opportunities for improvements in procedures, processes and equipment in work area

4. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Oher Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc.

		Nominated assessor needs to communicate the “Assessment Plan” including the “Different sources of evidence” to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-3: Practice effective workplace communication

Unit No	03
Unit Title	Practice effective workplace communication
Unit Code	**CONCM02V2/20**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Communicate with customers and colleagues							
Proper channels and methods of communication used	✓	✓	✓	✓		✓	✓
Workplace interactions with customers and colleagues appropriately made	✓	✓	✓		✓	✓	✓
Appropriate non-verbal communication used	✓	✓		✓	✓	✓	
Appropriate lines of communication followed	✓	✓	✓	✓	✓		✓
2. Speak English and Dhivehi at an operational level							
Workplace interactions with colleagues appropriately made	✓	✓	✓	✓		✓	✓
Verbal instructions or requests are responded to at an operational level	✓	✓	✓		✓	✓	✓
Appropriate non-verbal communication used	✓	✓		✓	✓	✓	
Simple requests are made	✓	✓	✓	✓		✓	✓
Routine procedures are described	✓	✓	✓		✓	✓	✓
Different forms of expression in English and Dhivehi is identified and used as appropriate	✓	✓		✓	✓	✓	
3.Participate in workplace meetings and discussions							
Meetings and discussions attended on time	✓	✓	✓	✓		✓	✓
Procedures to expressing opinions and following instructions clearly followed	✓	✓	✓		✓	✓	✓
Questions asked and responded to effectively	✓	✓		✓	✓	✓	
Meeting and discussion outcomes interpreted and implemented correctly	✓	✓	✓	✓		✓	✓
4.Handle relevant work-related documentation							
Conditions of employment are clear and understood properly	✓	✓	✓	✓		✓	✓
Relevant information accessed from appropriate sources	✓	✓	✓		✓	✓	✓
Relevant data on workplace forms and other documents filled correctly	✓	✓		✓	✓	✓	

Instructions and guidelines understood and followed properly	✓	✓	✓	✓		✓	✓
Reporting requirements completed properly		✓	✓		✓		
5.Manage workplace calls and messages							
Operate workplace phones	✓	✓	✓	✓		✓	✓
Attend and manage phone calls	✓	✓	✓		✓	✓	✓
Read and respond to texts and messages	✓	✓		✓	✓	✓	
Perform communication in both English and Dhivehi	✓	✓	✓	✓		✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play

1. Written questions

	Question	Answer
1	Define communication.	Communication is the process of transmitting information and common understanding from one person to another.
2	Define communication channels.	Communication channels are the means through which people in an organization communicate and interact with each other.
3	Identify the types of communication channels.	1. Communication channels by formality 2. Communication channels by means of communication
4	What are the three different communication channels based on formality?	1. Formal communication channels 2. Information communication channels 3. Unofficial communication channels
5	Briefly explain the three different communication channels based on formality.	**1. Formal communication channels** Formal communication includes exchange of information such as the goals, policies and procedures of an organization. Some of the most common examples of formal communication include company business plans, strategy, goals, annual reports, agreements, company-wide communications, workplace safety guidelines and procedures, board presentations etc. **2. Information communication channels** Informal communication channels are also used to deliver official business messages but in a more relaxed way. Some examples of informal communication include conversations at work addressing various issues that team members may have, lunch time conversations and continuous collaboration among team members. **3. Unofficial communication channels** In addition to official communication channels, there is also an unofficial mode of communication that is quite common in the workplace. Unofficial communication includes employee communication outside of work environment on topics not related to work.
6	What does it mean to divide communication channels by mean?	Dividing channels by the way and tools employees use to communicate with each other.
7	What are the three types of main means of communication in the workplace?	1. Digital communication channels 2. Face-to-face communication 3. Written communication
8	Briefly explain the three types of main means of communication in the workplace.	**1. Digital communication channels** Electronic means of communication include various online tools that employees use to stay connected with each other and keep up with the company news and updates. Today, digital communication channels are the most popular and most used channels in the workplace. Some of the examples include email, internal communication platforms, employee collaboration software and intranets.

		2. Face-to-face communication Even though electronic means of conversation in the workplace are taking over, face-to-face communication is still extremely important. This mean is much more personal, and it has more human touch into it. **3. Written communication** This type of communication is almost completely dead within organizations. However, written communication is still necessary when important policies, letters, memos, manuals, notices and announcements are being communicated to the employees.
9	Identify some basic rules of building social relationships.	• Identify the presence of your classmates • Work with the conversation • Share a bit of yourself • Empathy • Active listening
10	Briefly explain some basic rules of building social relationships.	• **Identify the presence of your classmates** We mean to greet or recognize the other person who is close to you. A smile or a look is enough to show that you have seen that person, basically nothing but good education. • **Work with the conversation** Starting the conversation yourself by telling your own experiences or asking the other person about your life is a good way to improve social relationships. In this way you will demonstrate your inclination to know that person more. By finding something that interests you or that you have in common, you will be creating the basis for future interactions. Do not forget to observe the details and focus on them, but always avoiding judging. • **Share a bit of yourself** A conversation is not only based on asking and listening, it is an interaction between two people, in which both can and should contribute their views. In this way, we must try not to fall into an "interrogation" and reveal our own feelings and opinions at the same time, since this will allow us to see our own perspective and create a true connection. • **Empathy** It is the basic quality to develop when interacting with other people and that can be demonstrated in different ways. We refer to the ability to put ourselves in the place of the other person, and show a real interest in connecting with them. This desire is also demonstrated through our body gestures and facial expressions; such as smiling or bowing are examples of nonverbal language that convey an idea of attention for what the other person expresses. Etc.
11	Briefly describe five ways of nonverbal communication used in the workplace.	• **Supports your message**. When having a conversation, participating in a meeting or engaging in conversation, nonverbal cues can emphasize and underscore the content of your message. For example, using

		hand gestures to indicate the importance of an idea may tell your listeners to pay attention to and remember a key point. • **Communicates messages.** You may also use nonverbal communication completely to communicate with others. For example, if someone is explaining a sentiment you admire and agree with, you might nod your head up and down to express solidarity. • **Communicates intention.** Your body language may also intentionally or unintentionally express your current condition. For example, people may pick up nonverbal cues that you are being dishonest, unengaged, excited or aggressive. • **Conveys feelings.** You can also use nonverbal communication to show your feelings, such as disappointment, relief, happiness, contentment and more. • **Offers support.** Nonverbal cues are also a great way to show support. Whether it's a simple smile or pat on the back, action may speak louder than words in many cases. Etc.
12	Briefly describe three tips to keep in mind when making a simple request.	• **Don't demand** People always resent being ordered around so make sure to avoid using imperatives when making requests. Saying, "Give me some time off" will never please your boss. Instead, start your request politely, for example, "I'd like to request some annual leave" or "I'd appreciate it if you could give me your feedback". • **Eliminate "I need"** Always talking about what you"need" can make you sound bossy and offensive because it shows that you think your needs are more important than other people's. Use questions like "Could you please…?" and "Would you be able to…?" to sound more considerate and polite. • **Avoid assumption** Even if you have an understanding boss, it's best not to make assumptions about being allowed to do certain things. If you want to leave early, it's much better to say "Would it be OK if I slipped out a bit early today?" than "I'm going to leave a bit early today". Think of the consequences of your request and what you will do to make up for any inconvenience caused. For example, if you need to leave a little early, explain when you will make up for the work you've missed. • **Steer clear of accusations** If your manager seems to have forgotten about your request, don't accuse him or her of not doing the work by saying, "Where are those figures I asked for?" For a simple yet effective reminder, just say, for example, "I was wondering if you've had the chance to calculate those figures." It's a non-threatening way to remind your boss of something he or she promised to do. Etc.

13	Identify and briefly explain the pre-requisites for a successful meeting,	**1. A clearly defined purpose for the meeting** Ask questions such as; Why are we meeting? What are we trying to achieve? Are we meeting for meetings sake? However, consider that at times the purpose of bringing people together for a meeting may be to achieve other important interpersonal objectives like team building, brain storming or group problem solving. Make sure that you clearly communicate the meeting purpose well before hand, this gives attendees time to gather ideas or research issues prior to attending the meeting. **2. Advise people of the meeting in time for them to be able to attend** It is amazing how often key people are left out of meetings or are not able to attend simply due to a lack of planning and sufficient notice. **3. Set an agenda** An agenda aims to keep discussions on track and to keep everyone focussed on the issues. The agenda should be distributed to attendees before the meeting. **4. Start and finish on time** Make sure the meeting starts and finishes on time so participants feel that their time is valued and that they can plan for effective meeting participation to fit within their work load. **5. Manage the participants** It is important that every person feels their attendance and contribution is valued. People must be given the opportunity to express their opinion as well as recognising they must also listen to others without interruption. Clear conflict management strategies must be in place.
14	Identify five common workplace documents.	1. Registration and Permit Certificates 2. Lease Contracts 3. Employment Contracts, Appraisal reports 4. Warranty and Insurance Certificates 5. Memorandum of Understanding (MOUs) 6. Memos, Policies, Letters, Meeting Minutes 7. Financial Records 8. Inventory Records
15	Briefly explain five common workplace documents.	**1. Registration and Permit Certificates** Whether it's a company or Sole Proprietorship, relevant registration certificates need to be carefully stored and kept as referred registration certificates may need to be produced for different purposes. **2. Lease Contracts** Companies big or small may have several lease contracts involving lease of the office space, equipment or land. Such lease contracts need to be properly managed and stored to ensure lease terms and other contractual terms are properly managed and implemented. **3. Employment Contracts, Appraisal reports** This contract sets and the appraisal reports need to be stored in order to minimize future disputes. Not every hire requires an employment agreement, but the document can be a useful if

		you want to dissuade certain new hires from leaving your company too soon, disclosing confidential information about your business, or going to work at a competitor. The contract should be reviewed by an experienced employment expert before given to an employee to sign. **4. Warranty and Insurance Certificates** Companies often procure expensive items that becomes part of their operational expenses and hence such equipment or tools may play a crucial role in the survival or growth of the enterprises. For this purpose, it is important that the Warranty or Insurance Certificates be kept safe and accessible to ensure business operations remain smooth and healthy always. **5. Memorandum of Understanding (MOUs)** An MOU falls somewhere between a formal contract and a handshake. It documents any important conversations you have with suppliers, potential partners and others involved in the business. MOUs are great ways to lay out the terms of a project or relationship in writing, but do not rely on the document to be legally binding Etc.
16	Identify three methods of managing workplace documents.	1. Re-organize your workspace 2. Get filing 3. Label clearly 4. Sort out loose documents 5. Use storage boxes 6. Use a digital filing system
17	Briefly explain three methods of managing workplace documents.	**1. Re-organize your workspace** Take the time to go through your existing files and documents, and sort out which documents are important enough to be kept on file, and which ones need to be shredded. Any duplicates can be thrown away, and anything you haven't used in the last 6 months can be put into recycling. Be sure to clear out any drawers and filing cabinets so you can start from scratch and organize a system that works for everyone **2. Get filing** There's good reason why filing cabinets are one of the most common forms of storage for documents, in the home and in the office. Broad headings will help to decrease filing time. However, you might want to consider adding subheadings to the more generalized folders to prevent cluttering and allow for easy finds **3. Label clearly** This is vital to keeping your filing system organized and free of accidental category mixing. Document folders can be labelled in order of topic and purpose. Dates are also good to include within the subcategories. Alphabetically ordering files is another popular way of organizing documents. While organizing things alphabetically is a good idea, many organizers recommend keeping an index of all the document folder names, allowing you to keep track of added categories. **4. Sort out loose documents**

		Some offices have baskets for documents that need to be filed or shredded. In order to keep on top of everything, it's best to get onto these documents as soon as you can to avoid piling up. Make sure you go through your 'to-file' basket carefully and filter out any documents you won't need in the immediate future, as well as duplicates. Etc.
18	What is bookkeeping?	Bookkeeping is the process of recording company's financial transactions into organized accounts on a daily basis.
19	Why is bookkeeping considered an essential part of accounting process?	When you keep transaction records updated, it can generate accurate financial reports that help measure business performance. Detailed records will also be handy in the event of a tax audit.
20	Identify three methods of bookkeeping.	1. Single-entry bookkeeping 2. Double-entry bookkeeping 3. Cash-based or accrual-based
21	Briefly explain three methods of bookkeeping.	**1. Single-entry bookkeeping** Single-entry bookkeeping is a straightforward method where one entry is made for each transaction in your books. These transactions are usually maintained in a cash book to track incoming revenue and outgoing expenses. You do not need formal accounting training for the single-entry system. The single-entry method will suit small private companies and sole proprietorships. **2. Double-entry bookkeeping** Double-entry bookkeeping is more robust. It follows the principle that every transaction affects at least two accounts, and they are recorded as debits and credits. For example, if you make a sale for $10, your cash account will be debited for $10 and your sales account will be credited by the same amount. In the double-entry system, the total credits must always equal the total debits. When this happens, your books are "balanced." **3. Cash-based or accrual-based** The next step is choosing between a cash or accrual basis for your bookkeeping. This decision will depend on when your business recognizes its revenue and expenses. In cashbased, you recognize revenue when you receive cash into your business. Expenses are recognized when they are paid for. In other words, any time cash enters or exits your accounts, they are recognized in the books. In the accrual method, revenue is recognized when it is earned. Similarly, expenses are recorded when they are incurred, usually along with corresponding revenues. The actual cash does not have to enter or exit for the transaction to be recorded.
22	Identify four methods of recording transactions.	1. Cash registers 2. The journal 3. The ledger 4. Trial balance
23	Briefly explain four methods of recording transactions.	**1. Cash registers** A cash register is an electronic machine that is used to calculate and register transactions. Usually, cash registers are used to record cash flow in stores. The cashier collects the cash for a

		sale and returns a balance amount to the customer. Both the collected cash and balance returned are recorded in the register as single-entry cash accounts. Cash registers also store transaction receipts, so you can easily record them in your sales journal. Cash registers are commonly found in businesses of all sizes. However, they aren't usually the primary method of recording transactions because they use the single-entry, cash-based system of bookkeeping. This makes them convenient for very small businesses but too simplistic for enterprises. **2. The journal** The journal is called the book of original entry. It is the place where a business chronologically records its transactions for the first time. A journal can be either physical (in the form of a book or diary), or digital (stored as spreadsheets, or data in accounting software). It specifies the date of each transaction, the accounts credited or debited, and the amount involved. While the journal is not usually checked for balance at the end of the fiscal year, each journal entry affects the ledger. As we'll learn, it is imperative that the ledger is balanced, so keeping an accurate journal is a good habit to keep. This form is useful for double-entry bookkeeping. **3. The ledger** A ledger is a book or a compilation of accounts. It is also called the book of second entry. After you enter transactions in a journal, they are classified into separate accounts and then transferred into the ledger. These records are transcribed by accounts in the order: assets, liabilities, equity, income, and expenses. Like the journal, the ledger can also be physical or electronic spreadsheets. A ledger contains a chart of accounts, which is a list of all the names and number of accounts in the ledger. The chart usually occurs in the same order of accounts as the transcribed records. Unlike the journal, ledgers are investigated by auditors, so they must always be balanced at the end of the fiscal year. If the total debits are more than the total credits, it's called a debit balance. If the total credits outweigh the total debits, there is a credit balance. The ledger is important in double-entry bookkeeping where each transaction changes at least two sub-ledger accounts. **4. Trial balance** The trial balance is produced from the compiled and summarized ledger entries. The trial balance is like a test to see if your books are balanced. It lists the accounts exactly in the following order: assets, liabilities, equity, income, and expenses with the ending account balance. An accountant usually generates the trial balance to see where your business stands and how well your books are balanced. This can then be cross-checked against ledgers and journals. Imbalances between debits and credits are easy to spot on the trial balance. It is not always error-free, though. Any miscalculated or wrongly-transcribed journal entry in the

		ledger can cause an incorrect trial balance. It is best to look out for errors early, and correct them on the ledger instead of waiting for the trial balance at the end of the fiscal year.
24	What are the three major financial reports that every business must know?	1. The cash flow statement 2. The balance sheet 3. The income statement
25	Define bank reconciliation.	Bank reconciliation is the process of finding congruence between the transactions in your bank account and the transactions in your bookkeeping records.
26	What are the consequences of failing to answer the telephone promptly and correctly?	• Loss of revenue • Loss of jobs • Poor or negative customer relations • Customers who are more difficult to deal with • Reduced business image in the eyes of the customer
27	Identify four examples of appropriate telephone manner.	• Using polite language at all times • Using appropriate welcoming or greeting phrases • Showing enthusiasm when taking a call • Being friendly • Making an offer of help to the caller
28	What are five things you should keep in mind when recording and passing on messages?	• Taking messages cheerfully • Using the designated telephone message form • Making sure you capture all the information the caller gives you • Ensuring you get the details correct • Repeating the message back to the caller to confirm it • Thanking the caller
29	Identify three reasons why internal electronic systems are beneficial when taking telephone messages.	• Facilitates recording of message • Saves time • Makes distribution of message easier

2. PT=Practical Test

#	Practical Activity	Validating Techniques
1	List workplace functions and relevant documentations needed to complete workplace tasks.	While answering, make sure they correctly list the workplace functions, documentations needed and also explain where they can access these documentations. They also should explain their role in in filling these documentations and where to get the relevant forms and also where to submit after filling them.
2	Ask students to write small paragraphs using both English and Dhivehi. Also examine their speaking competencies.	Check student test papers, assignments and validate if they have the competency to write in Dhivehi and English. Also check if they can speak in both Dhivehi and English.

3	Students participate in workplace meetings and discussions	Check if students have attended meetings and participated in workplace discussions. This can be validated by review role play exercises or meeting minutes that can be obtained at the time of assessment.
4	Complete work documents	Check if students have undertaken workplace documentations such as issuing receipts or filling up of forms such as leave forms etc. There can be different documentations that can be witnessed to ensure student competently attend workplace documentations.
5	Manage workplace calls and messages	Often calls and messages are linked to the work being performed across the workplaces. It is vital that student competency in making calls and messages be reviewed and validated through role plays or through recordings of previous messages and calls.

3. OW =Observation at work Place

#	Activities to be observed	Criteria to validate competency
1	Review all papers, assignments, log books and other relevant documents	Past papers, assignments, log books and other relevant documents can be reviewed to assess and evaluate the following competencies. ✓ Convey workplace information ✓ Speak English and Dhivehi at an operational level ✓ Complete relevant work-related documents ✓ Manage workplace calls and messages
2	Review the minutes of workplace meetings and discussions	By observing minutes of the meetings will illustrate how individual students have participated in the workplace meetings and discussions. Check for the ideas expressed by the individual students to assess and evaluate their performance.
3	Review already compiled workplace documentations	Every workplace has different sets of workplace documentations and by reviewing these documentations will help the assessor to assess and evaluate performance of individual students.
4	Review call and message logs	Review of the calls and messages log sheets will put light into the way how calls and messages are attended and managed by the students and can provide important evidence on the performance of the students within this respect area.

4. OQ=Oral Questioning

#	Oral questioning actvities	Answers
1	Convey workplace information	Students can be asked to provide information related to different information sources and their respective locations within the workplaces. Answers from the students will help the assessor to evaluate competencies of the students in conveying workplace information.
2	Speak English and Dhivehi at an operational level	Assessor can verbally ask questions and on site ask them to write both Dhivehi and English. Their responses can be used

		to assess and evaluate their performance in the respective competency.
3	Complete relevant work-related documents	Student filled workplace documentations can be reviewed and oral questions can be asked to assess and make judgments on the competencies of the students.
4	Manage workplace calls and messages	Workplace calls and message log can be viewed and different oral questions can be asked to assess and evaluate performance of the students.

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Oher Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-4: Provide effective customer care

Unit No	04
Unit Title	Provide effective customer care
Unit Code	**CONCM03V2/20**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Greet customers and colleagues							
Customers and colleagues greeted according to standard procedures and social norms	✓	✓		✓	✓	✓	✓
Sensitivity to cultural and social differences demonstrated	✓	✓	✓		✓		✓
2. Identify and attend to customer needs							
Appropriate interpersonal skills are used to ensure that customer needs are accurately identified	✓	✓		✓	✓	✓	✓
Customer needs are assessed for urgency so that priority for service delivery can be identified	✓	✓	✓		✓		✓
Personal limitation in addressing customer needs is identified and where appropriate, assistance is sought from supervisor	✓	✓		✓	✓	✓	✓
Customers informed correctly	✓	✓	✓		✓		✓
Personal limitation identified and assistance from proper sources sought when required	✓	✓		✓	✓	✓	✓
3. Deliver service to customers							
Customer needs are promptly attended to in line with organizational procedure	✓	✓		✓	✓	✓	✓
Appropriate rapport is maintained with customer to enable high quality service delivery	✓	✓	✓		✓		✓
Opportunity to enhance the quality of service and products are taken wherever possible	✓	✓		✓	✓	✓	✓
4. Handle inquiries							
Customer queries handled promptly and properly	✓	✓		✓	✓	✓	✓
Personal limitations identified and assistance from proper sources sought when required	✓	✓	✓		✓		✓
5. Handle complaints							

Responsibility for handling complaints taken within limit of responsibility	✓	✓		✓	✓	✓	✓
Personal limitations identified and assistance from proper sources sought when required	✓	✓	✓		✓		✓
Operational procedures to handling irate or difficult customers followed correctly	✓	✓		✓	✓	✓	✓
Details of complaints and comments from customers properly recorded	✓	✓	✓		✓		✓
6. Handle and manage angry customers							
Apply principles related to anger management	✓	✓		✓	✓	✓	✓
Meet with angry customers and console them accordingly	✓	✓	✓		✓		✓
Maintain a log book for recording customer service incidents	✓	✓		✓	✓	✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play

1. Written questions

#	Question	Answer
1	What are the importance of a good customer service?	• Increase customer loyalty • Increase the amount of money each customer spends with your business • Increase how often a customer buy from you • Generate positive word-of-mouth about your business
2	What are the 3 effective greeting rules?	1. Good Eye Contact 2. Great Smile 3. Great Opener
3	In a possible scenario; when a customer is approaching at your work station what are the steps which you will be following?	Step1: Introduction statement Step2: Gather info. Step3: Engage them in conversation Step4: Build bridges to the next step (whether it's making a sale or serving the customer)
4	Explain 1st and 2nd step elaborately.	Greeting step 1- Give an introduction statement: How about opening up with something like "Thanks for coming in!" Greeting step 2 - Gathering Free Information After the warm, inviting and professional greeting, will have to engage the customer in conversation. Seeking for the information they want from us.
5	What are the key elements for a new introduction to a new person?	1. Your name 2. How you can help them (Experience, qualifications ...etc.) 3. An open question to start the conversation
6	What are 6 important things to remember about greeting?	1. Make the customer feel welcome and appreciated. 2. Make eye contact when greeting the customer. 3. Never address a customer from behind – that's scary and creates unwanted pressure. 4. Address customers from a reasonable distance -- no shouting across the store/work station. 5. Create your unique, memorable greeting 6. Never stop greeting! If you pass customers/colleagues in the store/company, make sure to acknowledge them with a friendly smile.
7	What should you expect from a customer or client?	1. A person on the receiving end of what the business offers 2. Someone who is willing to pay a fair price for a quality product and wants to be neither over-charged nor under-served 3. The reason the company is in business 4. Someone who has certain needs and wants them filled and who, if we cannot fill them, will go to a competitor who will.

8	Explain these terms of the customer **needs**, **wishes** and **expectations.**	Needs: These underlie wishes and expectations and are the things customers are unable to do without. Wishes: These refer to the way in which our customer would prefer to satisfy a specific need, but they may not have the resources to meet these wishes. Expectations: These spring from the customers‟ needs and wishes but are also influenced by: • The company's image or reputation in the market • The customer's previous perceptions and their experience with the company • The company's advertising.
9	How will you identify customer needs, wishes and expectations?	• Involve the customers in developing new services • Use market research tools such as questionnaires, taste testing and observation to identify • Their likes and dislikes, needs and wants, expectations and experiences
10	How do you organize and conduct a series of focus groups and what is the benefit of this approach?	Establish a regular meeting between the establishment and specifically chosen customers. The customers should represent across-section of your clientele and each focus group meeting should have a well-defined focus point. The person chairing the focus group guides discussion, debate, opinion, feedback about the topic and records the input from the focus group members. This information becomes the basis for management-staff discussion and eventual policy modification, or creation. Focus groups are an excellent way of bringing "customer focus‟ to your service standards and service delivery.
11	What does it mean by actively listening to the customers?	Prompt the customers to communicate with you, follow-up on non-verbal cues when they talk to you as body language often indicates a hidden desire to say something. Encourage them to expand and clarify problems and criticism.
12	What does the phrase mean by "seeing from customer's eye"?	We have to strive to find out what our establishment and our service looks like from the customers‟ point of view. We can become too obsessed on what the service looks like from the delivery viewpoint, when really the customer sees it from a "receive‟ viewpoint. We need to identify how our service looks from the other side
12	Feedback is very important when it comes to improving customer services, How do we get customer feedback?	By implementing written response sheets and questionnaires, but also encouraging staffs to be proactive in soliciting verbal feedback from customers in a face-to-face setting such as at check-out, after they have finished their meal and via personal follow-ups with hosts and clients after functions
13	How do you meet the customer needs? Explain in step by step process.	1. Explain: Identify what your customers need from you through keyword research, focus groups, or social listening. 2. Distribute: Distribute the information to relevant stakeholders in your organizations 3. Collect: Collect customer feedback on how your efforts meet their expectations.

		4. Create: Craft product features or create content that speaks to your customer's needs
14	Developing standards and planning to address key quality service issues can be considerably tough. What are the important factors to consider by the management in developing standards?	• Different areas for which standards and plans may be created • Development process for plans and standards • Identifying several approaches towards quality management for staff and customers.
15	What factors should be taken into consideration while developing quality customer standards?	• Establish a "customer service" team of interested, experienced and dedicated staff – these will be your reference group and form the basis of the planning stage • Look at what other venues are providing in terms of service – try to describe their service in writing wherever possible • Identify the areas in the venue about which you believe there needs to be a customer service standard and a plan • Determine the standards to apply to the identified areas with reference to your image, reputation and advertising o Value-for-money for the customer o What the opposition is doing o Identified customer expectations • Incorporate the standards into a formal plan – this plan should identify: o Dates for implementation o Dates for review. Etc.
16	What are common monitoring methods?	• Workplace observation – watching what goes on at work, reading customer body language and measuring waiting times • Talking to customers – to get their feedback of service delivery • Talking to staff – to get their impressions, to identify obstacles to planned service delivery standards • Reading customer complaints and feedback • Analyzing business statistics – a reduction in patronage can indicate a need for attention to be paid to customer service, and can also indicate needs in other areas such as price, product.
17	What are areas of monitoring and to evaluate?	Marketing activities are a recognized way of monitoring and evaluating many things and may include the use of customer surveys as well as evaluation of any promotions conducted by the venue such as advertising. This includes the use of billboards, direct mail, radio, and TV, Internet and incentive promotions.

18	Inquiry management need to be tackled systematically to ensure continued growth of business. What are important six tips of managing the workflow of customer service inquires for positive results?	1. Develop a proper organizational chart 2. Prioritize support for customer service inquiries 3. Categorize inquiries 4. Enable self-service 5. Analyze the data 6. Test Different approaches
19	Explain the 3rd and 4th tips of managing the workflow of customer service inquires?	**Categorize Inquiries** • Once each customer service inquiry is prioritized, it should be segmented according to the type of request. In this way, the inquiry gets to the appropriate team member immediately for timely and effective responses. • First, it is important to define customer service categories, and then assign the correct people to each category based on their strengths and weakness. **Enable Self-Service** • While a large percentage of customers prefer more complicated customer service inquiries to be handled by a live person, there are many query cases that can be handled by self-service. For issues that show up again and again, and for those customer service inquiries with simple answers, you do not need to waste time or money responding over the phone, in live chat, or through email.
20	Please mention the 5 steps process for handling customer complaints.	1. Dig deeper of the problem by asking the right questions 2. Identify the type of customer you're dealing with 3. Respond to the customer quickly 4. Present a solution, and verify that the problem is solved 5. Log the complaint so you can track trends
21	Explain the 1st and 2nd steps for handling customer complaints.	Step 1: **Dig deeper by asking the right questions** Complaints from an angry customer can contain insights, and it should be our priority to seek out the point of friction. Further question and digging can help to get to the source of the issue. Step 2: **Identify the type of customer you're dealing with** When dealing with angry customers, react with firm politeness instead of responding rudely and avoid mirroring their confrontational behavior. When responding, avoid excuses and just get to the solution. Customers who contact you frequently. Stay patient and avoid coming across as frustrated when responding to these.
22	What are anger management techniques?	• Time out – take a break for a bit • Controlled breathing • Use calming self-statements such as "Cool it. You can handle this."

		• Relaxation skills • Changing beliefs that contribute to anger • Physical activity • Problem solving strategies • Write things down or compose an unsent letter • Learn assertiveness skills • Better Communication • Work on responses that help with your anger – develop a list of things to say to yourself before, during and after situations in which you may get angry.
23	What are recommended resources that can help to manage anger	• Support groups/ health support • Books • Courses • Qualified counsellor or psychologists
24	What are steps in dealing with irate customers?	1. Remain Calm 2. Don't take it personally 3. Use your best listening skills 4. Actively sympathize 5. Apologize gracefully 6. Find a solution 7. Take a few minutes on your own
25	Explain the 3rd and 6th step of dealing with irate customers?	**Use your best listening skills:** The first thing an angry customer wants is to vent. To do so, they need someone to listen—and, for better or worse, you are that person. Listening patiently can defuse a situation, as long as the customer feels acknowledged in his or her complaint. Hear them out. When they are done talking, summarize what you've heard and ask any questions to further clarify their complaint. Body language can be critically important here. Keep eye contact. Stand or sit up straight. Keep your arms uncrossed. Show how closely you're paying attention to their problem. **Find a solution:** Once you understand why the customer is unhappy, it is time to offer a solution. Ask him what he feels should be done or put forward your own fair and realistic answer to the problem. In most cases, that's all the customer is looking for and may result in providing some degree of satisfaction.
26	What are anger management strategies?	Recognising the signals of anger and becoming aware of how your anger works is the first step to change. The goal of anger management strategies is to not to suppress these emotions but reduce the 'heat' associated with your emotional feelings by offering alternatives that can help you manage them better. You can't get rid of, or avoid, the things or the people that may anger you, but you can learn to recognize anger warning signs and control your reactions.

2. PT=Practical Test

#	Practical Activity	Points to evaluate
1	Undertake customer service role play	Perform following role play activities. 1. Greet Customers and colleagues as they walk into an office or shop. During this role play, student performance needs to be measured and evaluated to assess their competency to greet customers and colleagues 2. Deliver service to customers as they approach customer desk and may include simulated shop or service counter. Referred exercise will involve serving customers and individual students will be assessed and evaluated based on their capacity to greet customers and delivery of service to customers.
2	Assignment on Customer Need Assessment	Students will produce an assignment that will interact with real customers across various SMEs to determine customer needs and compile a report detailing customer needs. Referred Assignment will be used to assess and evaluate the methodologies and strategies applied in determining customer needs.
3	Perform simulated front desk activity	Referred Front Desk role play will include the following. 1. Handle customer inquiries 2. Handle customer complaints 3. Handle and manage angry customers Referred three activities can be performed separately to ensure students are assessed and evaluated on handling of customer inquiries, complaints and managing angry customers.

3. OW =Observation at work Place

#	Activities to be observed	Evaluation of skills competencies
1	Observe customer service role play	During the customer service role play, make sure the students use proper body language, tone and the sounds in greeting customers. Also ensure that individual students are assessed in providing service to customers.
2	Inspect and evaluate the assignment that focused on determining customer needs	Students will produce an assignment that will interact with real customers across various SMEs to determine customer needs and compile a report detailing customer needs. Referred Assignment will be used to assess and evaluate the methodologies and strategies applied in determining customer needs.
3	Observe simulated front desk activity	While observing the front deck performance, make sure students are assessed on handling of customer inquiries, complaints and managing of angry customers.

4. OQ=Oral Questioning

#	Questions	Answers
1	How to greet customers?	Students should provide detailing theoretical knowledge related to greeting customers and they should also demonstrate practical aspects such as giving examples on greeting customers.
2	Explain methods of identifying customer needs	Students should begin answering this question by detailing the theoretical foundation on which customer needs can be determined followed by explanation on various strategies and protocols that may be used including their details.
3	Appropriate rapport for delivering quality customer care	Students need to list the qualities of good customer care with listing and detailing of the appropriate rapport that need to be stablished between the client and the customer for enhanced customer care.
4	Explain methods to apply for effective handling customer complaints	Students should competently explain methods of handling customer complaints by listing and details the theoretical aspects followed by giving practical examples.
5	Explain strategies for managing angry customers	Often, we find customer are dissatisfied with the service provided and they bring negative image to the establishment and the services it provides. Students should answer this question by detailing strategies and techniques for managing angry customers and taking care of them during such unwanted situations.

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Oher Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner

		with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-5: Perform computer operations

Unit No	05
Unit Title	Perform computer operations
Unit Code	**CONCM03V2/20**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Start computer, system information and features							
Adjust workspace, furniture and equipment to suit user ergonomic requirements	✓	✓	✓	✓		✓	✓
Ensure work organization meets organizational and occupational health and safety (OHS) requirements for computer operation	✓	✓	✓		✓	✓	✓
Start computer or log on according to user procedures	✓	✓		✓	✓	✓	
Identify basic functions and features using system information	✓	✓	✓	✓		✓	✓
Customize desktop configuration, if necessary, with assistance from appropriate persons	✓	✓	✓	✓		✓	✓
Use help functions as required	✓	✓	✓		✓	✓	✓
2. Organize files using basic directory and folder structures							
Create folders/subfolders with suitable names	✓	✓	✓	✓		✓	✓
Save files with suitable names in appropriate folders	✓	✓	✓		✓	✓	✓
Rename and move folders/subfolders and files as required	✓	✓		✓	✓	✓	
Identify folder/subfolder and file attributes	✓	✓	✓	✓		✓	✓
Move folders/subfolders and files using cut and paste, and drag and drop techniques	✓	✓	✓	✓		✓	✓
Save folders/subfolders and files to appropriate media where necessary	✓	✓	✓		✓	✓	✓
Search for folders/subfolders and files using appropriate software tools	✓	✓		✓	✓	✓	
Restore deleted folder/subfolders and files as necessary	✓	✓	✓	✓		✓	✓
3. Print information							
Print information from installed printer	✓	✓	✓	✓		✓	✓
View progress of print jobs and delete as required	✓	✓	✓		✓	✓	✓
Change default printer if installed and required	✓	✓		✓	✓	✓	

4. Apply web browsing skills							
Introduction to WWW	✓	✓	✓	✓		✓	✓
Acknowledge to gather relevant information from reliable sources	✓	✓	✓		✓	✓	✓
Use of search engines	✓	✓		✓	✓	✓	
Basic interaction of browser	✓	✓	✓	✓		✓	✓
Creating bookmarks in browser	✓	✓	✓	✓		✓	✓
Upload and download files	✓	✓	✓		✓	✓	✓
Navigation of hyperlink	✓	✓		✓	✓	✓	
5. Shut down computer							
Close all open applications	✓	✓	✓	✓		✓	✓
Shut-down computer according to user procedures	✓	✓	✓		✓	✓	✓
6. Basic Microsoft Word and Excel skills							
Ensure data is entered, checked and amended in accordance with organizational and task requirements, to maintain consistency of design and layout	✓	✓	✓	✓		✓	✓
Format spreadsheet using software functions; to adjust page and cell layout to meet information requirements, in accordance with organizational style and presentation requirements	✓	✓	✓		✓	✓	✓
Ensure formulae are used and tested to confirm output meets task requirements, in consultation with appropriate personnel as required	✓	✓		✓	✓	✓	
Use manuals, user documentation and online help to overcome problems with spreadsheet design and production	✓	✓	✓	✓		✓	✓
Format document using appropriate software functions to adjust page layout to meet information requirements, in accordance with organizational style and presentation requirements	✓	✓	✓	✓		✓	✓
Use system features to identify and manipulate screen display options and controls	✓	✓	✓		✓	✓	✓
Use manuals, user documentation and online help to overcome problems with document presentation and production	✓	✓		✓	✓	✓	

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play

1. Written questions

	Question	Answer
1	How can you improve a good posture and prevent lower back pain?	1. Adjust the chair height 2. Ensure your feet are firmly on the floor 3. Adjusting the chair angle 4. Adjusting the backrest angle 5. Setting the backrest height 6. Positioning the armrest height
2	Explain briefly one way to improve a good posture and prevent lower back pain?	1. Positioning the armrest height • If the armrest can be adjusted, position them so that they fit under the desk. • If you are taller than average, the above recommendations for adjusting your chair may not be suitable. • Consider an Adjustable Standing Desk or a Sit Stand • Workstation to bring the desk to your level.
3	How can you correctly set up your workplace to improve posture and correct support?	• Adjust the location of the keyboard to be 10-15cm in front of the edge of the desk. • The wrists should be straight and hovering over the desk. • The mouse should be as close as possible to the keyboard. • If you are using one monitor, position it directly in front. It should be an arm length away and angled slightly upward towards the eyes. • A document holder should be ideally positioned between the monitor and the keyboard. • Phone, calculators, and note-pads are all ideally positioned within easy reach.
4	Does your workstation require a footrest, explain your answer?	Yes. When setting up an ergonomic workstation, ensuring your legs and feet are well supported is crucial. If your feet aren't firmly flat on the floor, a footrest will be needed to improve your posture. A footrest will help in attaining the right foot elevation, leg and knee position.
5	State 3 general hazards to look carefully working in a computer station.	• Electric short-circuits • Radiation exposure • Noise exposure Etc.
6	What are 4 major functions of a computer?	• Taking data and instructions from a user • Processing the data as per instructions • Displaying data • Storing the processed data
7	What are technical terms of the basic function of a computer?	• Input function • Process function • Output function

		• Storage function
8	What are most common and modern input devices?	• Keyboard • Mouse • Scanners • Microphones • USB drives • Webcams Etc.
9	What does the computer uses when processing the input data?	CPU
10	What is a CPU?	It processes user instructions, executes scripts and programs, and runs commands of the OS that provide a platform for installing and using application software.
11	What are different forms of output functions that can be displayed?	• Monitor • Printer • Speaker • Displays Etc.
12	What are two types of storage components?	**Temporary**: Temporary storage components are used to store data temporarily. Data stored in a temporary storage component is erased when the system is shutdown. RAM is a compulsory temporary storage component. A computer uses the ram to store the running applications and their data. **Permanent**: Permanent storage components are used to store data permanently. Data stored in a permanent storage component is not erased when the system is shutdown. The hard disk is the most common permanent storage component
12	What are the benefits of naming conventions?	Naming records consistently, logically and in a predictable way will distinguish similar records from one another at a glance, and by doing so will facilitate the storage and retrieval of data. Through consistency and the application of logical standards we benefit from secure storage, and the ability to locate and access information.
13	What is the Web?	The Web, also known as the World Wide Web (WWW), is essentially a collection of an uncountable number of pages of information displayed on the Internet
14	Name three examples of web browsers?	• Mozilla Firefox • Safari • Google Chrome
15	How do you find information using a search engine?	Type the web address www.google.com into the address bar at the top of your screen. Then hit Enter on your keyboard

16	All the files in a computer must be identifiable and traceable. How can you achieve a good practice? Provide examples.	It can be done by applying referencing to all documents/files. For example: Document/file references will include: • file name, or full file path including file name • name/role of file author(s) or originator(s) • date of creation, edit or event which is the subject of the document/file • version number if applicable
17	What types of documents can you create with WORD and give examples?	• Letters: personal or business • Notices: basic flyers, menus and checklists • Reports- for school, work or a special interest group
18	What are mostly used commands in the Home Tabs of WORD, and explain each briefly?	1. **Font group**: The Font Group contains commands that change the appearance of the font. Font is the set of characters (letters, numbers, punctuation, etc.) in a particular style. 2. **Style group**: A document created from a template, like the one you opened earlier (Facet design blank), has pre- designed styles for different parts of the document, such as paragraphs and headers.
19	What is EXCEL and why people use it?	Excel is a spreadsheet program that allows you to store, organize, and manipulate data. Data can be text, numbers, and formulas. The data is entered into cells which are organized into columns and rows. Many people use Excel to keep a budget, use charts and graphs to show data, track sales for a business, and much more.

2. PT=Practical Test

#	Practical Activity	Evaluate Performance of the students
1	Undertake proper starting of the workplace computers	While performing the task, students will demonstrate knowledge and skills on the use of the computer and understand name of various parts and functions of workplace computers. Students will use proper starting procedures for safe and long-term use of the computers.
2	Possess skills to organise and manage folders and files in the computer	Workplace computers will have several documents and folders and need to be properly handled and managed. During preforming the practical activity, student will know where different folders are located and follow common procedures of handling workplace documents stored within the computers.
3	Perform simple print job using the computer and the printer.	Prior to giving the print job, students need to competently understand functions of different computers and printers and their scope of usage. In this regard, should check the printer connection to the computer and test the printer performance prior to giving a workplace document for printing.
4	Work on Microsoft Word and Excel files	While attending this task, students need to create and open new files on excel and word and work on these files. They should know simple features associated with these applications and apply them to workplace tasks.

5	Perform proper shut down of computer	At the end of shift workplace computers are shut down to leave them safe for the next business day. Make sure student safely perform this task and follow workplace instructions and procedures on the use of the computers at the workplaces.

3. OW =Observation at work Place

#	Activity to observe	Evaluate and assessment of the observations
1	Starting of the workplace computers	While starting the workplace computers, make sure the students follow safe and effective procedures and in particular, undertake standard operational procedures while starting the computers and preparing them for the workplace operations.
2	Organise and manage folders and files in the computer	Observe how the students use and manage the folders created on the workplace computers for the different workplace documents. Also evaluate competency of the students in handling and management of the folders and cross check the Standard Operating Procedures in using the workplace computers
3	Perform simple print	As the student attempts to attend simple print, make sure that appropriate procedures are followed while performing the print job.
4	Work on Microsoft Word and Excel files	While student creates and works on the word and excel files, makes sure their skill level and use of various tools are properly applied and the documents are properly saved and opened based on the work being performed.
5	Perform proper shut down of computer	As the students shut down computers, make sure they follow proper procedures and align these procedures to the workplace standards of the respective organizations. While shutting down, make sure manufacture recommendations are also taken applied.

4. OQ=Oral Questioning

#	Questions	Answers
1	What procedures are applied in starting the workplace computer?	Explain and demonstrate the following. ✓ Correct and healthy postures while sitting at computers ✓ Name of the various elements of the computers and their functions ✓ List the workplace procedures if any related to starting the workplace computers ✓ Explain correct steps to be used in starting the computer ✓ Start the computer system and prepare it for use

2	Explain how to use and manage the folders in the computer?	Explain and demonstrate the following. ✓ Reasons for creating folders and their applications ✓ Create folder and show to the assessor ✓ Show different folders created on the computer and explain functions
3	Explain steps used for making simple print	Explain and demonstrate the following. ✓ Explain the steps involved in making a simple print using the printer connected to the computer ✓ Select a document and show printer setting and giving print command ✓ Take a simple print
4	Explain how to apply browsing skills?	Explain and demonstrate the following. ✓ Use of search engines ✓ Basic interaction of browser ✓ Creating bookmarks in browser ✓ Upload and download files ✓ Navigation of hyperlink
5	Explain common tools and applications used in both Microsoft Word and Excel?	Explain and demonstrate the following. ✓ Explain functions of both Microsoft Word and Excel applications ✓ Create a small Microsoft Word file and save it ✓ Create a small Microsoft excel file and save it ✓ Open and edit them using different tools
6	What procedures are applied in shutting down the workplace computer?	Explain and demonstrate the following. ✓ Explain proper shutting down procedures of workplace computers ✓ Demonstrate steps involved in shutting down computers ✓ Perform shutting down of workplace computers in front of the assessor.

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.

3	**Oher Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-6: Provide first aid

Unit No	06
Unit Title	Provide first aid
Unit Code	**CONCM06V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Assess the situation							
Physical hazards and risks to self and others' health and safety identified	✓	✓	✓	✓		✓	✓
Immediate risks to self and casualty's health and safety minimized by controlling hazards in accordance with occupational health and safety requirements	✓	✓	✓		✓	✓	✓
The situation assessed and prompt decision taken on actions required	✓	✓		✓	✓	✓	
Assistance sought from relevant persons/authority, as required and at the appropriate time	✓	✓	✓	✓		✓	✓
2. Apply basic first aid techniques							
Casualty's physical condition assessed by visible vital signs	✓	✓	✓	✓		✓	✓
First aid provided to stabilize the patient's physical and mental condition in accordance with enterprise policy on provision of first aid and recognized first aid procedures	✓	✓	✓		✓	✓	✓
Available first aid equipment used as appropriate	✓	✓		✓	✓	✓	
3. Monitor the situation							
Back-up services appropriate to the situation identified and notified promptly	✓	✓	✓	✓		✓	✓
Information about the patient's condition reported accurately and clearly to emergency services personnel or health professionals	✓	✓	✓		✓	✓	✓
4. Prepare required documentation							
Documented emergency situations according to enterprise procedures	✓	✓	✓	✓		✓	✓
Clear and accurate reports are provided within required time frames	✓	✓	✓	✓		✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play

1. Written questions

	Question	Answer
1	Define the term First Aid?	First aid is any care given to an injured or ill person (called a 'casualty') before professional medical assistance (ambulance, paramedics, nurse, or doctor) arrives on the scene to take control of the situation
2	What can include in the provision of First Aid?	• Mouth-to-mouth resuscitation – if the casualty is not breathing • Cardio-Pulmonary Resuscitation (CPR) – where there is no breathing and no pulse • Control of bleeding – to limit blood loss • Wound care – to limit blood loss and infection by covering wounds • Treatment for burns and scalds – including treatment for electric shock • Bandaging and splinting – to fractures and sprains.
3	What are important to take into account when providing first aid?	• Protect yourself and others at all times against injury or harm – persons delivering first aid should not become casualties • The casualty must be protected against further harm or injury • Whenever there is a need to administer first aid make sure you notify your supervisor immediately to arrange for professional help to be called • Wear protective gloves when administering first aid to protect against infection.
4	How to identify hazards?	• Use common sense – this is the most important aspect • Use your sense of sight – look for things that could present a problem or danger. Look carefully in all directions. Be alert to smoke, fire and emerging issues • Use your sense of hearing – listen for escaping gas, crackling of flames or creaking of wood and metal • Use your sense of touch –vibrations or heat • Use your sense of smell –gas or smoke.
5	In order to minimize the risks of the hazards. Where general actions you can reduce these issues on site?	Casualties should not be moved until they have been assessed as being safe to move but if there is a serious and immediate risk of extra injury to a casualty from an identified hazard it is standard practice to move them away from the hazard. If uninjured bystanders are near an identified hazard, they must be told to move away to a safe location.

		Whenever there is identified danger from fire, gas leaks or smoke the emergency fire authorities must be called. Where there is an identified hazard from electricity, the electricity supply company or someone from within the workplace with knowledge of how to turn off the power must be contacted.
6	What are other often actions that can include in diminishing of risk of hazards?	• If there is a fire near the casualty – call the fire brigade, move the casualty out of the danger zone or fight the fire with nearby hoses, fire blanket or extinguisher • If the casualty's situation is being made worse by rain or sunshine – provide cover to the person • If gas is leaking from a damaged appliance – turn off the gas at the stop valve and make sure no one is smoking • If unstable items are near-by and posing a risk of – either move the items or casualty • If the casualty is in a position where they are likely to be run over by vehicles – move them or take action to stop traffic.
7	If a casualty is unconscious and unsure of an injury protecting neck is very vital. How can you help to protect the neck in case of this situation?	• Keep the casualty still – tell the casualty not to move • Kneel behind the head and place your hands on either side to support it – with the head, neck and spine in a straight line • Put rolled up towels, blankets, or clothing on each side of the casualty's head to keep it from moving.
8	The "fireman's carry" is used to move unconscious people or casualties who are unable to walk. What are the steps of fireman's carry?	• Place the casualty face down • Grab the person around the waist, and help bring him or her to a standing position, facing you • Keep one arm around his or her waist when you have him or her in the standing position grasp the casualty's right arm in your left hand and swing his or her arm around the back of your neck • Pull him or her across your shoulders by bringing his or her raised arm around your neck and over your shoulder. In this position, the injured person's legs will be over one shoulder, and his or her arm and head will be over the other shoulder • Reposition your hand from the person's waist to the back of his or her knee • Lift yourself with the injured person into a standing position.
9	What does DRABC stands for?	D for danger – assess the situation R for response – check consciousness, check on vital signs A for airway – open airway B for breathing – check respiration rates C for circulation – give chest compressions.
10	What are the important aspects of Danger in DRABC?	• Check for danger to yourself, the casualty and others. Look for obvious, immediate, life-threatening hazards such as fire, the possibility of a gas explosion, and electrical hazards

		• If there is danger around, you will need to move yourself and your casualty to prevent further injury to anyone • If you think the casualty has a spinal injury, take care to stop more damage to the spine by stopping movement of the casualty's neck and back.
11	What are the important aspects of Airway in DRABC?	• If casualty is not breathing, open the airway by placing one hand on their forehead and gently tilt the head back by lifting the chin • Remove any visible obstructions (vomit, mucus, saliva, false teeth, loose or broken teeth, food, tongue) from the mouth and nose to unblock the airways • If obstructions are present the casualty will not be able to breathe and the obstruction will also impede the provision of rescue breathing/mouth-to-mouth resuscitation also known as ear (expired air resuscitation).
12	How can you find a pulse? Explain briefly.	If there is no pulse and there is no sign of breathing, cpr (cardio-pulmonary resuscitation) must commence. A good point for taking the pulse is the neck (carotid arteries). Place the middle and index fingers on the casualty's larynx (voice box). Move the fingers to the side until you feel the groove (between the bone and the muscle) next to the trachea (wind pipe), then press on the groove until you feel the pulse. Place the tips of your index and middle fingers over the pulse site and press gently. Using a watch with a second hand. Count the pulse for 15 seconds and then multiply by four to obtain beats per minute. Write down your findings.
12	What is the normal pulse rate of an adult and what happens when the pulse rate rises more?	A normal pulse rate for an adult when resting is 60 to 80 beats per minute. The average is 72 beats per minute. A resting pulse rate of more than 80 beats per minute is a higher than normal pulse rate. This can be caused by shock, bleeding, heat, dehydration, fever, pain or exercise.
13	Before a causal assessment of the casualty what kind of information you must attain from the casualty? State why you would require this information.	If the casualty is conscious and able to talk, speak to them to obtain whatever history is available relating to their condition. By putting the history, signs and symptoms together, you will have a better assessment of the injury.
14	What are the key aims of first aid and explain each of them shortly?	1. **Preserve life**: the overriding aim of all medical care, including first aid, is to save lives and minimise the threat of death. 2. **Prevent further harm**: also, sometimes called prevent the condition from worsening, or danger of further injury. This covers both external factors, such as moving a patient away from any cause of harm, and applying first aid techniques to

		prevent worsening of the condition, such as applying pressure to stop a bleeding which becomes serious. 3. **Promote recovery**: first aid also involves trying to start the recovery process from the injury, and in some cases might involve completing a treatment, such as in the case of applying a plaster to a small wound.
15	In a sudden emergency situation such Obstruction (choking). How will you perform ABC intervention steps to before giving treatment?	Obstruction (choking) is a life-threatening emergency. For these reasons, when we get to the injured, care must first be brought to his or her airway (A) to ensure it is clear. Following evaluation of the airway, a first aid attendant would determine adequacy of breathing (B) and provide rescue breathing if necessary. Assessment of circulation (C) is now not usually carried out for patients who are not breathing. First aiders must conclude indirectly that unconscious patients, without breathing have no circulation and go straight to chest compressions. Pulse checks may be done on less serious patients. Once the ABCs are secured, first aiders can begin additional treatments, as required.
16	What are two types of wounds?	Open wound and closed wounds
17	Explain what open and closed wounds are?	• In open wounds, the skin is cracked open, leaving the underlying tissue exposed to the outside environment, which makes it more vulnerable to bleeding and infections. • In closed wounds, the skin is intact and the underlying tissue is not directly exposed to the outside world. Even with the skin intact, the damage can reach down to the underlying muscle, internal organs and bones. That is why these kinds of wounds can be complicated by severe bleeding, large bruises, nerve damage, bone fractures and internal organ damage.
18	Mention 3 types of open wounds.	• Incisions or incised wounds, caused by a clean, sharp-edged object such as a knife, razor, or glass splinter • Lacerations, irregular tear-like wounds caused by some blunt trauma • Abrasions, superficial wounds in which the topmost layer of the skin (the epidermis) is scraped off. Abrasions are often caused by a sliding fall onto a rough surface
19	Mention 2 types of closed wounds.	• Contusions, more commonly known as bruises, caused by a blunt force trauma that damages tissue under the skin. • Hematomas, also called a blood tumor, caused by damage to a blood vessel that in turn causes blood to collect under the skin.
20	What are the following measures that can be taken in giving first aid to a	1. Stop the bleeding 2. Minor cuts and scrapes usually stop bleeding on their own

	victim of an open wound?	3. If they don't, apply gentle pressure with a clean cloth or bandage. Hold the pressure continuously for 20 to 30 minutes and if possible, elevate the wound. 4. Clean the wound 5. Rinse out the wound with clear water. Soap can irritate the wound, so try to keep it out of the actual wound. If dirt or debris remains in the wound after washing, use tweezers cleaned with alcohol to remove the particles. To clean the area around the wound, use soap and a washcloth. 6. Cover the wound 7. If the bleeding slows, cover the wound with a clean dressing and bandage. Dressings and bandages can help keep the wound clean and keep harmful bacteria out. A dressing is a sterile pad or compress (usually made of gauze or cotton wrapped in gauze) used to cover wounds, to control bleeding and/or prevent further contamination
21	What are the following measure that should be taken in giving first aid to a victim of a closed wound?	1. Application of direct pressure, preferably with ice wrapped in a cloth, for several minutes, in order to arrest the bleeding as well as to reduce the swelling. 2. Elevation of the affected region will also support in reducing the pressure as well as the re-absorption process and it should be practiced as and when appropriate.
22	What are reasons or cases to seek help immediately from a health professional?	• If the wound is in the head, chest or abdomen (unless it is minor). • If there is blue, white or cold skin, numbness, tingling, loss of feeling, or the person is unable to move a limb below the wound. • If your tetanus shots are not up to date, especially if the object that caused the puncture was dirty, such as a rusty nail or farm implement. • If a deep wound to the foot occurred through a shoe. • If an animal bite is severe and may need stitches, or if it is on the hand or face. Etc.
23	What is external bleeding?	External bleeding is generally described in terms of the origin of the blood flow by vessel type.
24	What are the categories of external building	1. Arterial bleeding 2. Venous bleeding 3. Capillary bleeding
25	Explain what venous bleeding is?	Venous bleeding: This blood is flowing from a damaged vein. As a result, it will be blackish in colour (due to the lack of oxygen being transported) and will flow in a steady manner. Caution is still indicated; while the blood loss may not be arterial, it can still be quite substantial, and can occur with surprising speed without intervention.

26	What is internal bleeding?	Internal Bleeding is one of the most serious consequences of trauma. It may occur after any significant physical injury.
27	What are the main types of trauma that can cause internal bleeding?	1. **Blunt trauma** - This kind of trauma happens when a body part collides with something else, usually at high speed. Blood vessels inside the body are torn or crushed either by shear forces or a blunt object. Examples are car accidents, physical assaults, and most falls. 2. **Penetrating trauma** - This happens when a foreign object penetrates the body, tearing a hole in one or more blood vessels. Examples are gunshot wounds, stabbings, or falling onto a sharp object.
28	What are the most serious internal bleeding which can be caused by a trauma?	• Head trauma with internal bleeding (intracranial hemorrhage) • Bleeding around the lungs (hemothorax) • Bleeding around the heart (hemopericardium and cardiac tamponade) • Tears in the large blood vessels near the center of the body (aorta, superior and inferior vena cava, and their major branches) • Damage caused by trauma to the abdomen such as liver or spleen lacerations or perforation of other soft organs Etc.
29	What are the following measures that need to be taken in giving first aid to a victim of external bleeding?	1. Wash your hands to avoid infection and put on gloves 2. Lay on the injured person down and cover the person to prevent loss of body heat. 3. If possible, position the person's head slightly lower than the trunk or elevate the legs and elevate the site of bleeding 4. While wearing gloves, remove any obvious dirt or debris from the wound. Don't remove any large or more deeply embedded objects. 5. Your principal concern is to stop the bleeding.
30	How can you stop bleeding by applying pressure directly on the wound?	• Use a sterile bandage or clean cloth and hold continuous pressure for at least 20 minutes without looking to see if the bleeding has stopped. • Maintain pressure by binding the wound tightly with a bandage or clean cloth and adhesive tape. • Use your hands if nothing else is available. • If the bleeding continues and seeps through the gauze or other material you are holding on the wound, don't remove it. Instead, add more absorbent material on top of it
31	If bleeding doesn't stop while applying direct pressure on the wound how are you	• If the bleeding doesn't stop with direct pressure, apply pressure to the artery delivering blood to the area. • Squeeze the main artery in these areas against the bone. Keep your fingers flat.

	going to stop the bleeding?	• With your other hand, continue to exert pressure on the wound itself.
32	What is fracture and what the main types of fractures?	A fracture is the medical term for a broken bone. There are many types of fractures, but the main categories are open, and closed.
33	Explain an open fracture.	An open fracture is one in which the bone breaks through the skin. This is an important difference from a closed fracture because with an open fracture there is a risk of a deep bone infection
34	Explain a closed fracture.	A closed fracture is when the bone breaks but there is no puncture or open wound in the skin.
35	What are the symptoms to identify a fracture?	DOTS: D for deformity, O for open wounds, T for tenderness and S for swelling
36	What are the following measure to be taken in giving first aid to a victim with bone injury?	• Don't move the person except if necessary to avoid further injury. Take these actions immediately while waiting for medical help: o Stop any bleeding o Apply pressure to the wound with a sterile bandage, a clean cloth or a clean piece of clothing.
37	What is the purpose of splinting?	Splinting reduces pain, prevents further damage to muscles, nerves and blood vessels, prevents closed fracture from becoming open fracture and reduces bleeding and swelling.
38	In case of emergency what can serve as a splint?	In an emergency, almost any firm object or material can serve as a splint such as sticks, boards, or even rolled up newspapers. If none can be found, use a rolled blanket or clothing. An injured body part can also be taped to an uninjured body part in order to prevent it from moving.
39	How can you appropriately prepare a splint and give an example?	Splint must be well padded on the sides touching the body; if they are not properly padded, they will not fit well and will not adequately immobilize the injured part. Before applying splint open wounds must be covered. We have to immobilize in position found. A basic rule of splinting is that the joint above and below the broken bone should be immobilized to protect the fracture site. For example, if the lower leg is broken, the splint should immobilize both the ankle and the knee.
40	How can you treat a person who is feeling faintish or loss of breath?	• If the person feels faint or is breathing in short, rapid breaths, lay the person down with the head slightly lower than the trunk and, if possible, elevate the legs.
41	What is a dislocation and how can it be caused?	A dislocation is an injury in which the ends of bones are forced from their normal positions. The cause is usually trauma resulting from a fall, an auto accident or a collision during contact or high-speed sports.
42	What are the symptoms of dislocation?	Rapid swelling and discoloration, loss of ability to use the joint, severe pain and muscle spasms, possible numbness and loss of pulse below the joint, and shock are characteristic symptoms of dislocations.

43	What is a sprain?	A sprain is a stretching or tearing of ligaments — the tough bands of fibrous tissue that connect one bone to another in your joints.
44	What are common location for a sprain?	The most common location for a sprain is in ankle.
43	What are the following measures that needs to be taken in giving first aid to a victim with joint injury?	1. For dislocations, splint and provide care as you would for fracture. 2. For sprains, use RICE procedure - R=rest, I=Ice, S=compression and E=elevation
44	What are the following measure that needs to be taken in giving first aid to a victim with suspected spinal cord injury?	1. Seek medical assistance immediately. Call for EMS (102) 2. Until EMS arrives: • DO NOT move victim unless absolutely necessary to save victim's life. • DO NOT bend or twist victim's neck or body. Careful handling is extremely important. • Maintain position in which victim was found and immobilize head, neck, shoulders, and torso - roll up towels, blankets, jackets, or clothing, and place around head, neck, shoulders, and torso 3. If the person is not breathing or showing signs of circulation, begin CPR but do not lift the chin to open an airway. Instead, you should gently pull the jaw forward 4. If victim must be moved to perform rescue breathing, to clean mouth of vomit or in danger of further injury, enlist help at least one other person to keep victim's head, torso, and legs in straight line as you turn victim.
45	What are burns?	Burns are thermal injury caused by exposure to excess heat.
46	What are the four types of burns?	1. Burns that affect only the superficial skin are known as superficial or first-degree burns. 2. When damage penetrates into some of the underlying layers, it is a partial-thickness or second-degree burn. 3. In a full-thickness or third-degree burn, the injury extends to all layers of the skin. 4. Sometimes we talk about a fourth-degree burns when the injury affects deeper tissues, such as muscle or bone.
47	What are the actions to be taken for a minor burn injury?	**1. Cool the burn.** • Hold the burned area under cool (not cold) running water for 10 or 15 minutes or until the pain subsides. • If this is impractical, immerse the burn in cool water or cool it with cold compresses. • Don't put ice on the burn **2. Cover the burn with a sterile gauze bandage** • Wrap the gauze loosely to avoid putting pressure on burned skin.

		• Bandaging keeps air off the burn, reduces pain and protects blistered skin. **3. Take an over-the-counter pain reliever** • These include aspirin, ibuprofen , naproxen or acetaminophen • Use caution when giving aspirin to children or teenagers. • Talk to your doctor if you have concerns.
48	What are the actions to be taken for a major burn injury?	For major burns, call 112 or emergency medical help. Until an emergency unit arrives, follow these steps: **1. Don't remove burned clothing.** • However, do make sure the victim is no longer in contact with smoldering materials or exposed to smoke or heat. **2. Don't immerse large severe burns in cold water** • Doing so could cause a drop in body temperature (hypothermia) and deterioration of blood pressure and circulation (shock). **3. Check for signs of circulation** (breathing, coughing or movement). • If there is no breathing or other sign of circulation, begin CPR. **4. Elevate the burned body part or parts.** • Raise above heart level, when possible. **5. Cover the area of the burn** • Use a cool, moist, sterile bandage, clean, moist cloth or moist cloth towels
49	What can happen to a person when he/she is in shock and how can you protect a person in shock?	When a person is in shock, his or her organs aren't getting enough blood or oxygen. If untreated, this can lead to permanent organ damage or death. Shock can be a life- threatening problem. The best way to protect people from the serious damages that shock can have on the system is to recognize the symptoms before the person gets into serious trouble.
50	What are common symptoms that can be present in a shocked situation?	• Pale, cold, clammy and moist skin • Vacant or dull eyes, dilated pupils • Anxiety, restlessness, and fainting • Weak, rapid, or absent pulse • Nausea and vomiting
51	How can you monitor a situation while the ambulance and why should you wait for an ambulance rather than taking the injured or ill person to the hospital yourself?	They can get the patient to hospital quickly, legally, and more safely. 1. Stay on the line with 911 and follow emergency instructions. 2. Stay calm and try to keep the patient calm. 3. Don't move a patient who was injured in an automobile accident or fall, or who was found unconscious. 4. If the patient is cold, cover them with a blanket.

		5. Don't give an injured person anything to eat or drink (unless instructed by the 911 dispatcher). 6. Have someone watch for the ambulance and show the crew how to get to the patient. (This is especially important in an apartment or office building, or if your address is hard to see from the street).
52	Documentation or systemic incident reports related to various incidents occurring while the worker in on duty. What are the following benefits for the team or organization in documentation related issues?	1. Incidents Reports will maintain alertness among all the stakeholders 2. Most incident report forms identify the barriers that prevent adverse situations from developing into a major accident or disaster. Recording of the small to medium events will ensure major stakeholders of the organization is kept alert and hence reduce number of accidents or injuries to guests as well as to the staff of the organization. 3. Lessons learned within the organisation and benchmarks between industries 4. The gathered data can be used for comparisons both within and between organisations and industries. Even though the incident categories and types differ between industries, verticals and even functions, the habit of being aware in the field and documenting the observations is the same. 5. Reporting is cheaper than the costs of a major incident

2.PT=Practical Test

#	Practical Activity	Performance to be evaluated
1	Perform role play of an accident	During the role play, ensure the students perform the following. ✓ Assess and evaluate for existing hazards and dangers and try to reduce or manage threats ✓ Assess and evaluate dangers to the person injured ✓ Assess and evaluate dangers to the person attending the injured patient ✓ Monitor the situation carefully
2	Apply basic first aid techniques	As students to perform first aid techniques on the following ✓ Relevant first aid techniques for cases of breathing, blood circulation and consciousness ✓ Attend injuries related to ▪ Abdominal trauma ▪ Allergic reactions ▪ Bleeding ▪ Chemical contamination ▪ Choking ▪ Cold injuries ▪ Cardio-vascular failure ▪ Dislocations and fractures ▪ Drowning

		▪ Poisoning and toxic substances ▪ Medical conditions including epilepsy, diabetes, asthma ▪ Eye injuries ▪ Head injuries ▪ Minor skin injuries ▪ Neck and spinal injuries ▪ Needle stick injuries ▪ Puncture wounds and cuts ▪ Crush injuries ▪ Shock ▪ Smoke inhalation ▪ Sprains and strains ▪ Substance abuse ▪ Unconsciousness ▪ Infections ▪ Inhalation of toxic fumes and airborne dusts ▪ Bone and joint injuries ▪ Eye injuries ▪ Burns and scalds, thermal, chemical, friction and electrical
3	Prepare required documentation	Students are asked to prepare following documents ✓ Incident reports

3. OW =Observation at work Place

#	Activity to be observed	Assessment and evaluation of the task being performed
1	Observe if student evaluate the situation	During the role play, assess and evaluate how students assess and evaluate the situations. Ensure the way they approach the incident is with care and to see if they take a moment to review existing dangers and evaluate dangers to the patient or to self.
2	Apply basic first aid techniques	Students will be performing various first aid procedures stated above. It is important that the four-step process in providing basic first aid activities. Assess and evaluate competencies of the students in attending relevant first aid activities and interventions performed as part of the assessment.
3	Prepare incident reports	Observe how students approach in making the incident report and assess and evaluate the format and structure of the report and inclusion of the all the relevant data into the report.

4. OQ=Oral Questioning

#	Questions	Answers
1	How to assess and evaluate the situation	Students need to detail steps of assessing and evaluating the situation as soon as they arrive the site of the accident. Such steps need to focus on assessing and evaluating of the surrounding environment, immediate danger to the injured person and to the person attending the site.

2	Explain techniques of providing different first aid techniques	Student need to explain proper procedures and techniques in attending the following first aid procedures. ▪ Abdominal trauma ▪ Allergic reactions ▪ Bleeding ▪ Chemical contamination ▪ Choking ▪ Cold injuries ▪ Cardio-vascular failure ▪ Dislocations and fractures ▪ Drowning ▪ Poisoning and toxic substances ▪ Medical conditions including epilepsy, diabetes, asthma ▪ Eye injuries ▪ Head injuries ▪ Minor skin injuries ▪ Neck and spinal injuries ▪ Needle stick injuries ▪ Puncture wounds and cuts ▪ Crush injuries ▪ Shock ▪ Smoke inhalation ▪ Sprains and strains ▪ Substance abuse ▪ Unconsciousness ▪ Infections ▪ Inhalation of toxic fumes and airborne dusts ▪ Bone and joint injuries ▪ Eye injuries ▪ Burns and scalds, thermal, chemical, friction and electrical
3	How to keep monitoring the patient while waiting for the paramedic personnel	Students need to explain how to keep monitoring the patient while waiting for the paramedic personnel or being transported to a health facility.
4	Explain structure and information to be included in the incident report	Students need to explain the structure and the date to be included within the Incident Reports. In particular, make sure the reports are prepare according to relevant standards and will be compliant to standard incident reports.

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being

		performed and hence can be another important source of information for the assessment.
3	**Oher Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-7: Respond to Fire

Unit No	07
Unit Title	Respond to Fire
Unit Code	**CONCM07V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Prepare for fire							
Procedures related to a fire emergency are accessed, interpreted and rehearsed	✓	✓	✓	✓		✓	✓
Location of firefighting equipment is identified and the equipment is checked in accordance with organizational procedures and referred for maintenance/replacement as required	✓	✓	✓		✓	✓	✓
2. Carry out initial notification and assessment							
Nature and scope of the fire is identified, confirmed and reported to appropriate personnel	✓	✓	✓	✓		✓	✓
Fire situation is assessed and appropriate course of action is determined in keeping with requirements for personal safety	✓	✓	✓		✓	✓	✓
Notification of fire threat is undertaken in accordance with authorized procedures	✓	✓		✓	✓	✓	
Emergency evacuation procedures are followed, where appropriate, and in accordance with organizational procedures	✓	✓	✓	✓		✓	✓
3. Extinguish fires							
Fires are extinguished using the appropriate equipment, materials and procedures	✓	✓	✓	✓		✓	✓
Extinguisher is applied to ensure fast knockdown of fire	✓	✓	✓		✓	✓	✓
Extinguisher is used at the appropriate range and time	✓	✓		✓	✓	✓	
Extinguisher is used to minimize damage to equipment and facilities and to minimize risk of injury to personnel	✓	✓	✓	✓		✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play

1. Written questions

#	Question	Answer
1	What is fire?	Fire is very rapid oxidation. Rusting iron and rotting wood are common examples of slow oxidation. Fire, or combustion, is rapid oxidation as the burning substance combines with oxygen at a very high rate.
2	What are common causes of workplace fires?	• Faulty Electrics • Flammable or combustible materials • Human Error • Negligence • Arson
3	Explain 2 common causes of workplace fires?	1. Faulty Electrics are a very common cause of workplace fires and include loose wires and antiquated or faulty equipment. Every employer needs to ensure that fixed electrical equipment is maintained on a regular basis. 2. Flammable or combustible materials represent a danger to your staff and your business. Every company should prioritize fire safety when undertaking risk assessments, and this is crucial in premises that hold any flammable or combustible materials or substances that must be stored appropriately stored and disposed of correctly. All staff should attend a fire safety training course to ensure correct procedure.
4	What are the three things that are needed for combustion to take place?	• fuel (to vaporize and burn) • oxygen (to combine with fuel vapour) • heat (to raise the temperature of the fuel vapour to its ignition temperature).
5	What are the five classes of five?	Classes of fire Combustible and flammable fuels have been broken down into five categories: • Class A fires are those involving organic solids such as paper or wood • Class B fires are those involving flammable liquids • Class C fires are those involving flammable gases • Class D fires are those involving metals • Class F fires are those involving cooking oils
6	What are activities that needs to be continuously performed in preventing fires form occurring?	1. Risk assessment 2. Fire prevention 3. Undertake regular fire risk assessment 4. Follow fire precautions at all times 5. Evaluate and ensure means of escape 6. Undertake regular fire emergency planning 7. Undertake regular training and sharing of information

		8. Maintain record keeping or log books
7	Explain how risk assessment can be take in prevention of fire.	The first step in fire prevention is to assess the risks and record them in a risk register. This requires reviewing and assessing the means by which a fire might start and spread, the potential consequences and the available approaches to mitigate the risk. This includes assessing day-to-day operations, risks associated with periodic building and maintenance work and those arising from installing new equipment, or adopting new or changing technologies.
8	Explain how to undertake regular fire risk assessment.	The responsible person must ensure that a suitable and sufficient fire risk assessment of the premises is completed and reviewed on a regular basis. A fire risk assessment is an organised and methodical look at the premises, the activities carried on there and the likelihood that a fire could start and cause harm to those in and around the premises. There is no set format or approach but a template is provided that may assist establishments in completing a fire risk assessment.
9	Explain the following of fire precaution at all times briefly.	In the event of a fire occurring, there should be suitable measures in place to detect a fire, give warning of fire and that mitigate the spread of smoke and fire. • Fire detection and warning systems should be installed • Emergency lighting should be installed • Firefighting equipment (fire extinguishers) should be installed • Fire signs, notices and plans should be fitted • Fire doors should be fitted in accordance with good practice and well maintained
10	Explain how to evaluate and ensure means of escape.	The ability of the occupants of a building to evacuate in the case of fire is a fundamental aspect of fire safety. In the case of a fire, or indeed any other emergency, people should be able to turn away from the hazard and escape to the open air or other place of safety. Escape routes should be inspected regularly to check they are not obstructed and that fire exit doors are unlocked.
11	Explain how to undertake fire emergency planning.	When a fire situation is detected, it is vital that establishments have in place appropriate procedures. All establishments need to prepare a fire emergency plan under the guidance of experts. It is vital that the emergency plan is tested so as to ensure that all staff are aware of the procedures to be followed in the event of a fire. This can be achieved by undertaking a desk-top exercise and also by completing regular fire drills (at least once every half-term).
12	How can you maintain record keeping or log books?	To prepare well, it is important that appropriate records are kept in a specified log book or file and the records need to be checked for accuracy. In particular, the log book need to include the following. • Details of any significant findings from the fire risk assessment and any action taken

		• Testing and checking of escape routes, including final exit locking mechanisms, such as panic devices, emergency exit devices and any electromagnetic devices; • Testing of fire-warning systems, including weekly alarm tests and periodic maintenance by a competent person; recording of false alarms; • Testing and maintenance of emergency lighting systems; • Testing and maintenance of fire extinguishers, hose reels and fire blankets • Recording and training of relevant people and fire evacuation drills; • Maintenance and audit of any systems that are provided to help the fire and rescue service • The fire emergency plan
12	What continuous assessment and maintenance regulatory requirements and good practices?	1. **Portable Fire Fighting Equipment**: All portable firefighting equipment has to be checked by a competent person on an annual basis (e.g. extinguishers, fire blankets and hoses). 2. **Fire Detection and Warning Systems** (alarms): Fire alarm tests need to be carried out in accordance with requirements. This requires weekly tests of the audible fire alarm system, quarterly and annual tests of all devices such as heat and smoke detectors, call points and sounders should also be carried out by a competent contractor. 3. **Emergency Lighting**: Emergency lighting should be tested by facility maintenance team on a regular basis to ensure the workplace is lit during emergency situations such as fire. 4. **Evacuation Paths**: Every workplace needs to have proper pathways worked out and displayed to the staff in the event of fire. Referred pathways and doors and need to be checked on regular basis to prevent fatalities and reduce damage to the staff in case of fire.
13	What are the portable fire-fighting equipment?	Normally available fire-fighting equipment includes portable appliances such as extinguishers, buckets of sand or water and fire-resistant blankets. In larger premises you will find automatic sprinklers, hose reels and hydrant systems.
14	What are the main five types of fire extinguishers?	Water, Foam, Dry Powder, CO2 and Wet Chemical.
15	How can you follow the procedure of extinguishing fire using the (**PASS**)? Explain each step of them briefly.	• Pull the safety pin, this will allow you to discharge the extinguisher. • Aim the extinguisher the base of the fire, this will allow you to hit the fuel. • S- Squeeze the top handle or lever, this will release the pressurized extinguishing agent.

		• S- Sweep the extinguisher hose from side to side until the fire is completely out. Wait and carefully check that the fire is out and has not reignited. If it has reignited, spray again – but remember that a typical fire extinguisher usually provides only 60 seconds of extinguishing power.
16	What are the regular inspection that are required to follow while extinguishing fire?	• Fire extinguishers should be mounted on the wall to prevent being damaged. • The area in front of the extinguisher shall be kept clear at all times. • The pressure gauge should be in the green zone at all times. • Fire extinguishers should be inspected on a monthly basis. • Know the location of all fire extinguishers in your facility.
17	Mention few protective equipment used.	1. Bunker gear 2. Fire Helmet 3. Protective hoods 4. Boots and gloves Etc.
18	Why is an emergency evacuation procedure or plan important?	Fire represents one of the biggest workplace safety threats and can result in serious injuries or even fatalities. Workplace fires can also cause extensive property damage, and can render the worksite either destroyed or out of service indefinitely. For these reasons, an effective workplace fire evacuation plan is important.
19	What are basic fire safety you must need to know for every worksite?	• Know the location of the fire extinguishers in the workplace. You should be aware where the nearest extinguisher is at all times • Know where your nearest emergency exits are • Know the difference between alarm signals to quickly recognize the situation
20	What should do when you discover a fire?	• Alert all other individuals within the workplace by activating the nearest fire alarm, shouting clearly or by using other procedures set in place by your company • Use the nearest exit to evacuate the workplace • Use a fire extinguisher to put the fire out. Be careful while doing this and do not attempt if yours or other safety is at risk or on large fires
21	What should be done during evacuation at a worksite?	• Stay calm and evacuate the building immediately when you hear the fire alarm. • Along the escape route, close (don't lock) all the doors and windows you pass by so that you can cut the fire and smoke off from spreading to the other rooms • Go to the assembly point and alert your relevant supervisors that you are safe and outside the building

		• Adhere to any protocols put in place by your company
22	What are the essential fire evacuation steps to be taken by every team, or company?	• Know the location of the fire extinguishers in the workplace. • Every worker must be aware where the nearest extinguisher is at all times. • Know where your nearest emergency exits are. Know the difference between alarm signals to quickly recognize the situation. • Knowing all of these can make all the difference in saving lives and preventing unnecessary damage.
23	How and where can standard/multi-purpose dry powder be used along with the risk or danger of this extinguisher?	**Application**: The powder 'knocks down' the flames. Safe to use on most kinds of fire. Multi-purpose powders are more effective, especially on burning solids; standard powders work well only on burning liquids. **How to use**: Aim the jet at the base of the flames and briskly sweep it from side to side. **Dangers**: The powder does not cool the fi re well. Fires that seem to be out can re-ignite. Doesn't penetrate small spaces, like those inside burning equipment. The jet could spread burning fat or oil around.
24	How and where can Water be used along with the risk or danger of this extinguisher?	**Application**: The water cools the burning material. You can only use water on solids, like wood or paper. Never use water on electrical fires or burning fat or oil. **How to use**: Aim the jet at the base of the flames and move it over the area of the fire. **Dangers**: The water can conduct electricity back to you. Water actually makes fat or oil fires worse – they can explode as the water hits them.
25	How and where can CO_2 be used along with the risk or danger of this extinguisher?	**Application**: Displace oxygen with CO2 (a non-flammable gas). Good for electrical fires as they don't leave a residue. **How to use**: Aim the jet at the base of the flames and sweep it from side to side. **Dangers**: Pressurized CO2 is extremely cold. DO NOT TOUCH. Do not use in confined spaces.
26	How and where can Foam/AFFF be used along with the risk or danger of this extinguisher?	**Application**: The foam forms a blanket or film on the surface of a burning liquid. Conventional foam works well only on some liquids, so it's not good for use at home, but AFFF is very effective on most fires except electrical and chip-pan fires. **How to use**: For solids, aim the jet at the base of the flames and move it over the area of the fire. For liquids, don't aim the foam straight at the fire – aim it at a vertical surface or, if the fire is in a container, at the inside edge of the container. **Dangers**: 'Jet' foam can conduct electricity back to you, though 'spray' foam is much less likely to do so. The foam could spread burning fat or oil around.
27	There are many fire extinguishers that can used for different purposes. In order to identify the types of	Standard/Multi-purpose dry powder: Blue Water: Red CO_2: Black Foam/AFFF (Aqueous Film Forming Foam): White or cream

	extinguisher it is, there are colours given for it. Distinguish the different types of extinguishes by giving its respective colours.	
28	What are the dpoints to consider when using a fire extinguisher?	• never use a fi re extinguisher unless you have been trained to do so • do not use water extinguishers on electrical fi res due to the risk of electric shock and explosion • do not use water extinguishers on oils and fats as this too can cause an explosion • do not touch the horn on CO2 extinguishers as this can freeze burn the hands • do not use the CO2 extinguisher in a small room as this could cause suffocation • Read the operating instructions on the extinguisher.

2.PT=Practical Test

#	Practical Activity	Assess and evaluate performance of the student
1	Carry out steps involved in undertaking preparations needed to fight fires	Students will be assessed while performing the practical that involved carrying out preparatory steps related to undertaking preparations to fight fires. Make sure the students perform preparation steps in sequence and follow the standard procedures of preparations required. Some of these include but not limited are as follows. ✓ identify emergency alarms and match with response requirement ✓ apply evacuation procedures ✓ assess fire situation and notify authorities ✓ identify, select and use firefighting equipment
2	Simulate incidents of reporting fires	Carry out a role play activity where students will be taking reports of a fire. Make sure they ask the right questions and gather all the relevant information and data while documenting a fire incident.
3	Extinguish simple fires	Students should demonstrate the following competencies 1. Use the following accessories related to fire fighting ✓ Extinguishers ✓ Fire blankets ✓ Fire hose reels ✓ Fire hydrants ✓ Firefighting vehicles ✓ Personal protection equipment (PPE) 2. Inspect and manage fire alarms 3. Inspect serviceability of fir extinguishers

		4. Extinguish fires of different class using relevant firefighting procedures

3. OW=Observation at work Place

#	Activity to be observed	Assess and evaluate performance of the activities
1	Carry out steps involved in undertaking preparations needed to fight fires	Make sure students undertake preparation steps in correct sequence and complete the following. ✓ identify emergency alarms and match with response requirement ✓ apply evacuation procedures ✓ assess fire situation and notify authorities ✓ identify, select and use firefighting equipment such as extinguishers, fire blankets, fire hose reels, fire hydrants, firefighting vehicles and use of personal protective equipment (PPE)
2	Simulate incidents of reporting fires	Make sure the students capture all the relevant technical information and data about the ongoing fire and while taking report of fire incidents being reported.
3	Extinguish simple fires	While extinguishing fire students should demonstrate competencies related to the use of fire extinguishers, fire blankets, fire hose reels, fire hydrants, firefighting vehicles, personal protection equipment (PPE). Students should also have relevant knowledge and skills to inspect and manage fire alarms Inspect and service fire extinguishers and constantly inspect and service them accordingly Attend live fire simulations and extinguish fires of different class using relevant firefighting procedures

4. OQ=Oral Questioning

#	Questions	Answers
1	What activities need to be performed in preparation for extinguishing fire	Students need to detail different preparatory procedures that includes uses of the firefighting equipment and they are as follows. ✓ emergency alarms and response requirement ✓ evacuation procedures ✓ how notify authorities ✓ use firefighting equipment such as extinguishers, fire blankets, fire hose reels, fire hydrants, firefighting vehicles and use of personal protective equipment (PPE)
2	How to carry out initial notification and assessment	Make sure the students capture all the relevant technical information and data about the ongoing fire and while taking report of fire incidents being reported.

3	Explain steps involved in extinguishing fire	Students should demonstrate competencies related to the use of fire extinguishers, fire blankets, fire hose reels, fire hydrants, firefighting vehicles, personal protection equipment (PPE). Students should explain knowledge and skills to inspect and manage fire alarms Students should explain to inspect and service fire extinguishers and constantly inspect and service them accordingly Should explain procedures related to fire.

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-8: Apply Science and Engineering Measurements

Unit No	08
Unit Title	Apply Science and Engineering Measurements
Unit Code	**CONS02CR01V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Apply basic mathematics							
Perform simple calculations on: fractions and decimals, calculations to a number of significant figures, decimal places	✓		✓	✓	✓		✓
Identify and use the multiples and sub-multiples of units	✓	✓		✓		✓	✓
Perform calculations on: perimeter and area of plane figures (i.e. square and rectangle, triangle, circle), volume and surface area (i.e. cube, rectangular prism, cylinder), mass of containers and their contents (i.e. cube, rectangular prism, cylinder)	✓		✓	✓	✓		✓
Perform mathematical calculations involving formulas, angles, triangles and geometric construction	✓	✓		✓		✓	✓
Identify and use formulas for SI quantities: length, area, volume, mass, density	✓		✓	✓	✓		✓
Identify the elements of a circle Parts: radius, diameter, circumference, chord, sector, segment, arc, tangent	✓	✓		✓		✓	✓
Identify and use the ratio of sides of 45° and 60° right angled triangles	✓		✓	✓	✓		✓
Identify and use the rules of 3:4:5 and 5:12:13 for the sides of right-angled triangles	✓	✓		✓		✓	✓
Solve simple workshop problems involving Pythagoras and right-angled triangles	✓		✓	✓	✓		✓
Evaluate and transpose simple formulae associated with workshop problems	✓	✓		✓		✓	✓
Convert minutes and seconds to decimal fractions of a degree	✓		✓	✓	✓		✓
2. Apply Fundamental of Science							
Systems of measurements, Motion in one dimension and two dimensions	✓		✓	✓	✓		✓

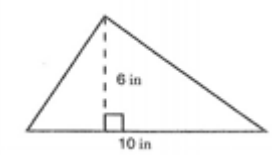
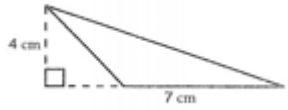
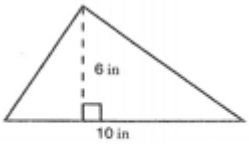
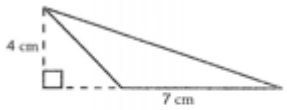
Newton's Laws I & II	✓	✓		✓		✓	✓
Gravity	✓		✓	✓	✓		✓
Mechanics of solids and fluids	✓	✓		✓		✓	✓
3. Demonstrate simple drawing							
Identify angles, plane figures and types of drawing	✓		✓	✓	✓		✓
Identify first and third angle orthographic projections of isometric or oblique views	✓	✓		✓		✓	✓
Identify single plane sectional views of simple components	✓		✓	✓	✓		✓
Perform basic drafting	✓	✓		✓		✓	✓
Read and interpret drawings	✓		✓	✓	✓		✓
Introduce basics of AUTOCAD	✓	✓		✓		✓	✓
4. Undertake relevant measurement							
Identify measuring devices	✓		✓	✓	✓		✓
Follow appropriate measuring procedures	✓	✓		✓		✓	✓
Keep record of the measurements	✓		✓	✓	✓		✓

Note:

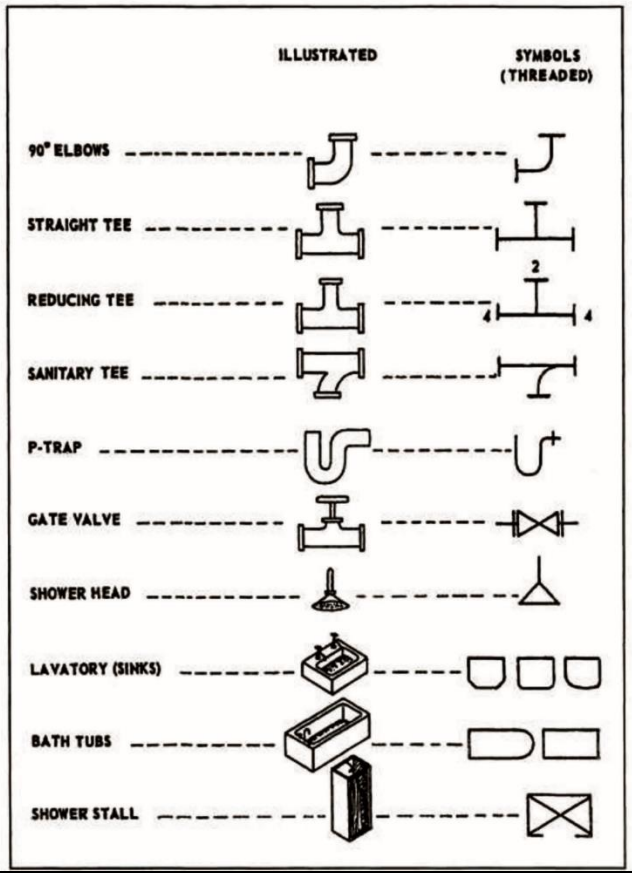
- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play

1. Written questions

#	Question	Answer
1	Define fractions.	A number that represents part of a whole.
2	What are the two types of fractions?	✓ Common fraction ✓ Decimal fraction
3	What are decimal fractions?	Decimal fractions are similar to common fractions in that they describe part of a whole object.
4	What fractions do welders primarily work with and why?	Decimal fractions, because they have to work with tenths and hundredths.
5	List the units used for the following physic quantities: a. Area b. Volume c. Velocity d. Density e. Acceleration f. Density g. Pressure	✓ Area: m^2 ✓ Volume: m^3 ✓ Velocity: $m\ s^{-1}$ ✓ Density: $m\ s^{-2}$ ✓ Acceleration: ✓ Density: $kg\ m^{-3}$ ✓ Pressure: $N\ m^{-2}$ or Pa
6	Define perimeter.	The distance around a figure.
7	What two figures have all angles which are 90°?	✓ Square ✓ Rectangle
8	Find the area for the following: a. Square (6km) b. Square (12cm)	✓ 36km^2 ✓ 144cm^2 ✓ 48cm^2 ✓ 8m^2

	c. Rectangle (6cm by 8cm) d. Rectangle (4m by 2m)	
9	How do you find the area of a triangle?	✓ ½ x breadth x height
10	Find the area of the following: a.  b. 	✓  $A = \frac{1}{2}bh$ $A = \frac{1}{2}(10)(6)$ $A = 30\ \text{in}^2$ ✓  $A = \frac{1}{2}bh$ $A = \frac{1}{2}(7)(4)$ $A = 14\ \text{cm}^2$ ✓
11	How do you find the volume is a prism?	Cross-sectional area × length
12	How do you find the volume of a cylinder?	$\pi r^2 h$ (Where r is the radius and h is the height of the cylinder)
13	A cylinder has a volume of 965 cm3. If the height of the cylinder is 16 cm, find the radius. Give your answer to 2 significant figures.	Substitute the information from the question into the formula for the volume of a cylinder: Volume of cylinder = $\pi r^2 h$ $965 = \pi \times r^2 \times 16$ $965 = \pi \times 16 \times r^2$ $965 = 50.26548 \times r^2$ $19.198 = r^2$ $4.38156 = r$ So the radius of the cylinder is 4.4 cm (to 2 SF)
14	Define constant velocity.	Motion that does not change in speed nor direction.
15	Is constant velocity positive or negative?	Both.
16	What are the two conditions that must be met for an object to be moving with constant velocity?	✓ Must have constant speed ✓ Must be moving in a constant direction
17	What does Newton's Second Law state in terms of velocity?	Newton's second law (F=ma) suggests that when a force is applied to an object, the object would experience acceleration. If the acceleration is 0, the object shouldn't have any external forces applied on it. Mathematically, this can be shown as the following: $\mathbf{a} = \frac{\mathrm{dv}}{\mathrm{dt}} = 0 \Rightarrow \mathrm{v} = \mathrm{const.}$
18	How do you calculate an object's velocity?	Given a graph as in, we can calculate the velocity from the change in distance over the change in time.
19	Define projectile motion.	Projectile motion is the motion of an object thrown, or projected, into the air, subject only to the force of gravity.

20	What are the two types of plumbing sketches?	✓ Orthographic ✓ Isometric
21	Briefly explain orthographic sketching.	Orthographic sketching is best described as a two dimensional drawing shown from a vantage point. Building plans for example are illustrated as if someone was looking down on them(top view), this is called a plan view and best describes horizontal features; such as underground piping for example. Another common orthographic view is a front view; also called an elevation view. An elevation view is from the perspective of a person standing in front of a structure and best describes vertical features; such as a plumbing stack.
22	Briefly explain isometric sketching.	An isometric sketch is a two dimensional drawing that creates the illusion of three dimensions using angular lines. This is the preferred drawing method for plumbers as it shows the most information about the piping layout. Although an isometric drawing is the most complex to draw, it has definite advantages; such as showing both horizontal and vertical piping on a single drawing. Making an isometric sketch is accomplished by imagining yourself at the lowest point (downstream) in a plumbing system and drawing it as you would see it; if it was laid out from lower left to upper right.
23	Briefly explain a disadvantage of isometric sketches.	The one problem with an isometric sketch arises when pipes are on angles other than horizontal or vertical; such as 45 degree fittings. These "odd" angles are drawn as they would appear using 60 degree angles. When trying to draw circles in isometric drawings you will have to use an ellipse.
24	How do you find the circumference of a circle?	To know the circumference of a circle, multiply its diameter by 3.1416.
25	How do you find the area of a circle?	To calculate the area of circle, multiply the square of the diameter by 0.7854.
26	How do you calculate the side of a hexagon inside a circle?	To calculate the side of a hexagon inside in a circle, multiply the diameter of the circle by 0.500.
27	How do you calculate the side of an equilateral triangle inside in a circle?	To calculate the side of an equilateral triangle inside in a circle, multiply the diameter of a circle by 0.866.
28	How do you calculate the volume of a ball (sphere)?	To calculate the volume of a ball (sphere), multiply the cube of the diameter by 0.5236.
29	List 5 commonly used measuring tools.	✓ Steel ruler ✓ Caliper ✓ Screw gauge (micrometer) ✓ Measuring tape ✓ Pressure gauge
30	What is the Vernier caliper used to measure?	The meter scale is used to measure the length to the nearest millimeter only. For measuring smaller lengths precisely, Vernier caliper is used. It is a precision instrument used to measure the internal and external lengths.

31	Identify 5 plumbing symbols with illustrations.	

2.PT=Practical Test

#	Practical Activity	Assess and evaluate performance of the student
1	Student Assignments	Students need to undertake assignments related to applying science and engineering measurements, as they continue with the unit. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Apply basic mathematics ✓ Apply Fundamental of Science ✓ Undertake relevant measurement
3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Apply basic mathematics ✓ Apply Fundamental of Science ✓ Undertake relevant measurement
4	Demonstrate how to measure using a pressure gauge	The student is expected to follow the correct step-by step process to measuring with a pressure gauge. The elements which should be assessed are: ✓ used to take external measures of objects outside jaws

		✓ used to take internal measures of objects inside jaws ✓ used to measure the depth of objects depth probe

3. OW=Observation at work Place

#	Activity to be observed	Assess and evaluate performance of the activities
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Apply basic mathematics ✓ Apply Fundamental of Science ✓ Undertake relevant measurement
2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities related to the above areas or elements covered within the competency unit.
3	Student Assignments	During the implementation of the training program, students would have completed assignments related to plumbing. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Demonstrate how to use Vernier caliper	As the students attend the practical test to check their knowledge about Vernier calipers, make sure the student use the proper techniques and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Answers
1	Apply basic mathematics	Make sure the students answer questions related to the following areas ✓ Perform simple calculations on: fractions and decimals, calculations to a number of significant figures, decimalplaces ✓ Identify and use the multiples and sub-multiples of units ✓ Perform calculations on: perimeter and area of plane figures (i.e. square and rectangle, triangle, circle), volume and surface area (i.e. cube, rectangular prism, cylinder), mass of containers and their contents (i.e. cube, rectangular prism, cylinder) ✓ Perform mathematical calculations involving formulas, angles, triangles and geometric construction ✓ Identify and use formulas for SI quantities: length, area, volume, mass, density

		✓ Identify the elements of a circle Parts: radius, diameter, circumference, chord, sector, segment, arc, tangent ✓ Identify and use the ratio of sides of 45° and 60° right angled triangles. ✓ Identify and use the rules of 3:4:5 and 5:12:13 for the sides of right-angled triangles. ✓ Solve simple workshop problems involving Pythagoras and right-angled triangles. ✓ Evaluate and transpose simple formulae associated with workshop problems. ✓ Convert minutes and seconds to decimal fractions of a degree.
2	Apply Fundamental of Science	Make sure the students answer questions related to the following areas ✓ Systems of measurements, Motion in one dimension and two dimensions ✓ Newton's Laws I & II ✓ Gravity ✓ Mechanics of solids and fluids
3	Demonstrate simple drawing	Make sure the students answer questions related to the following areas ✓ Identify angles, plane figures and types of drawing ✓ Identify first and third angle orthographic projections of isometric or oblique views. ✓ Identify single plane sectional views of simple components. ✓ Perform basic drafting ✓ Read and interpret drawings ✓ Introduce basics of AUTOCAD
4	Undertake relevant measurement	Make sure the students answer questions related to the following areas ✓ Identify measuring devices ✓ Follow appropriate measuring procedures ✓ Keep record of the measurements

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.

3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-9: Perform workshop practice

Unit No	09
Unit Title	Perform workshop practice
Unit Code	**CONS02CR02V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Identify and explain functions tools used in mechanical workshop							
Sketch and name tools used in the mechanical workshop	✓	✓		✓	✓	✓	
Explain functions of the identified tools and scope of their use	✓		✓	✓	✓		✓
2. Identify and explain properties of various pipes and their applications							
Identify types of pipes used in plumbing and sewerage services	✓	✓		✓	✓	✓	
Interpret functions and their application within plumbing and sewerage operations	✓		✓	✓	✓		✓
Demonstrate joining methods of the pipes	✓	✓		✓	✓	✓	
Familiarize with fitting used on these different pipes	✓		✓	✓	✓		✓
3. Use measuring instruments properly							
Identify names and functions of various measuring instruments used in mechanical workshop	✓	✓		✓	✓	✓	
Demonstrate use of various measuring instruments	✓		✓	✓	✓		✓
4. Undertake basic arc welding							
Apply general and electrical safety related to welding	✓	✓		✓	✓	✓	
Observe safe connection of welding plants to electrical networks	✓		✓	✓	✓		✓
5. Perform basic workshop practices	✓	✓		✓	✓	✓	
Undertake marking out on metals	✓		✓	✓	✓		✓
Perform metal cutting using hack-saw	✓	✓		✓	✓	✓	
Perform drilling holes on metal pieces							
Perform filing on metal pieces	✓	✓		✓	✓	✓	

Note:

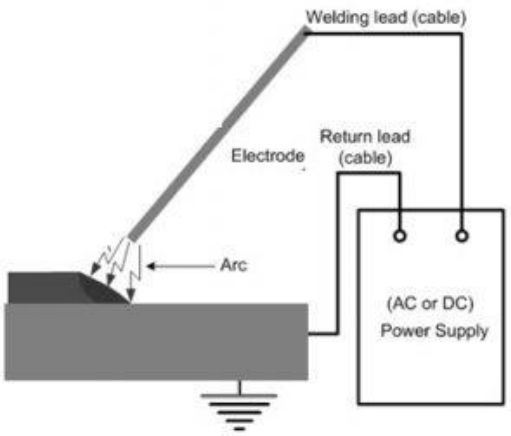
- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play.

1. Written questions

#	Question	Answer
1	What are brass or copper head hammers used for?	Brass or copper head hammers are used in engine and transmission rebuilds.
2	What are the uses of chisels?	A mechanic will need a 3-4 different size cutting chisels, they're used for a variety of uses. When working on old cars often they'll be used to remove old rusty fasteners, cutting sheet metal, exhaust system repairs etc.
3	What are the uses of wire brushes?	Useful for removing rust and dirt from bolt threads before removing them, cleaning brake components, brake lines, rusty sheet metal etc.
4	What are the uses of adjustable wrench?	The adjustable wrench is a universal wrench, adjust it to fit any nut or bolt. They're pretty durable kit and can be struck with a hammer when called for.
5	What are the different forms of sockets?	• Standard • Deep set, • Plug sockets • O2 sockets • Low profile sockets • Impact sockets • Wheel sockets • Insulated sockets • Crows feet
6	What are the five plumbing pipe materials?	Copper, galvanized steel, polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC) and cross-linked polyethylene (PEX).
7	What are the pros of using copper pipes?	• Longevity: Copper has proven to be a reliable material that can last at least 50 years. • Durability: Copper is a sturdy material that is not prone to leakage or corrosion. • Safety: Bacteria cannot thrive in copper pipes, and copper will not pollute water in any way, so it is safe to transport drinking water. • Recyclability: When copper pipes eventually need to be replaced, the material can be recycled. • Temperature Tolerance: Copper is able to stand up to extreme temperature changes, including hot and cold water.

8	What are the cons of using copper pipes?	• Financial Cost: The main deterrent to using copper is the cost. The value of copper as a global commodity has gone up in recent years, so today, it will cost you approximately $285 for 100 feet of piping. • Environmental Cost: Environmentally-conscious homeowners may be concerned about the fact that copper mining and manufacturing take a toll on the environment. So, although copper pipes last a long time and can be recycled, they are not considered a "green" product.
9	What are the cons of galvanized steel pipes?	• Short Lifespan: Galvanized steel pipes last about 20 to 50 years before they begin to break down. This lifespan may not seem too short, but it pales in comparison to the lifespans of many other piping materials. • Rust: Especially in pipes with a small diameter, rust can build up inside over time. In some cases, the rust can break loose from the inside walls of the pipe and end up mixing with the water as it flows through. This discolors the water. • Lead Contamination: If pipes become corroded, lead can leach into the water inside, making it unsafe to drink. • Clogs: Over time, mineral build-up inside of galvanized pipes can begin to form clogs that block water flow. • Weight: The downside to these pipes being very sturdy is that they are also extremely heavy. This makes them difficult to work with. • Vulnerability: When galvanized pipes are damaged, the galvanization on the outside is compromised, which makes the pipe vulnerable to corrosion in a short amount of time.
10	What are the pros of Polyvinyl Chloride pipes?	• Longevity: PVC is not subject to rust or corrosion, so unless it experiences some sort of unexpected damage, it can last indefinitely. Even the most durable metals used in plumbing pipes cannot live up to the impressive lifespan of PVC. • Ability to Handle Pressure: PVC is often used for the main supply line that goes into your home because it is able to handle high water pressure. • Ease of Use: PVC is extremely light compared to metal pipes, which makes it easy to transport and to work with. It is also easy to work with because there is no soldering required to connect pipes. Instead, pipes are essentially glued together. • Low Cost: PVC is low in cost as well. Especially compared to copper, PVC is a very inexpensive option for plumbing pipes.
11	What are the cons of Polyvinyl Chloride pipes?	• Susceptibility to Warping: PVC is not equipped to transport hot water. This is because, like most plastics, heat can cause the material to warp and melt.

		• Size: Sizing options for PVC pipes are limited, which can be an issue at times. Even if your PVC piping is the perfect size, fittings used to connect PVC pipes can tend to be bulky, which can be problematic in tight spaces.
12	What the pros of Chlorinated Polyvinyl Chloride?	• Longevity: Like PVC, since CPVC is a plastic material, it does not react to corrosive substances and does not rust, so its lifespan is indefinite. • Ability to Handle Pressure: CPVC shares PVC's ability to handle high water pressure, making it a good material for a main water supply line. • Ease of Use: CPVC is also quite lightweight, which makes it easy to move and work with. CPVC is also somewhat flexible. • Low Cost: Though CPVC costs more than PVC, it is still a budget option compared to metal piping materials. • Temperature Tolerance: CPVC is able to withstand extreme temperatures up to 200 degrees Fahrenheit. This equips CPVC to handle hot water transport. • CPVC does not have many clear disadvantages, though it may not always be the best choice. Cons include: • Indoor Application Only: CPVC is vulnerable to breaking down if exposed to sunlight for extended periods of time. • Cost Compared to PVC: Though cost was included as an advantage of CPVC, when comparing it directly to its close cousin, PVC, it does cost more.
13	What are the types of pip joint?	• Threaded joint • Brazed joint • Soldered joint • Welded joint (butt welded, socket welded) • Flanged joint • Compression joint • Grooved joint
14	What is threaded joints?	Threaded joint means, pipes are connected by screwing with the help of threads provided for each pipe. One pipe having internal threads and the other one having threads externally. Cast iron pipes, copper pipes, PVC and G.I pipes are available with threads. Threaded joints are available from 6mm diameter to 300mm diameter pipes. They are preferable for low temperature areas and low pressure flows.
15	How is the brazing process?	Brazing is the process of jointing pipes using molten filler material at above 840oC. Brazing is generally used for joining copper pipes or copper alloy pipes. The filler material majorly consist tin which has great affinity towards copper. The melting point of parent metal should be higher than filler metal. Mechanical strength of brazed joint is low compared to other joints.

16	What is soldering?	Soldering is also similar to brazing but the only difference is in case of soldering the filler metal melts at below 840oC. Soldering also used to joint copper and copper alloy pipes. Before proceeding to soldering flux called paste is applied to pipes and fittings to prevent them from oxidation from flame.
17	What are flanged joints?	Flanged joints are used for high pressure flows and for large diameter pipes. In general they are used for plain end pipes or threaded pipes. Two flange components are connected by bolts at the pipe joint to prevent leakage.
18	Why is Vernier caliper used for?	Vernier Caliper is a widely used linear measurement instrument with a least count of 0.02 mm. It is used to measure linear dimensions like length, diameter, depth. Two types of measurement we can do, the first one is through external jaw (measure external dimensions) and another one is internal jaw (measure internal dimensions).
19	What is micrometer used for?	External Micrometer is also known as Outside Micrometer or External Micrometer. It is used to check outside diameter of circle by the means of accuracy of 0.01 mm or up to 0.001 mm.
20	Explain the difference between micrometer and Vernier caliper.	1. Usually Micrometer is more accurate and precise than Vernier caliper 2. Measurement range of micrometer is 25 mm while vernier caliper has wide range. 3. You can check depth by vernier caliper but in case of micrometer you have to use Depth Micrometer 4. Inside Micrometer is used for measurement of inner diameter but in case of vernier caliper it is checked by internal jaw.
21	What is electric arc welding?	The definition of arc welding is a welding process that is used for welding the metals with the help of electricity to generate sufficient heat for softening the metal, as well as when the softened metal is cooled then the metals will be welded.
22	Describe arc welding process with circuit diagram.	In Arc welding process, heat can be generated through an electric arc struck among an electrode as well as the workpiece. The electric arc is glowing electrical discharge among two electrodes using ionized gas.  Any type of arc welding technique depends on an electric circuit that mainly includes different parts like power supply, workpiece, welding electrode & electric cables to connect the electrode as well as workpiece toward the power supply. The electric arc winding circuit can be formed by an electric arc among the electrode as well as the workpiece. The temperature

		of the arc may arrive at 5500°C (10000°F), which is enough to combine the edges of the workpiece. Once a long join is necessary then the arc can be moved through the joint line. The weld pool of the front edge dissolves the welded surface once the back edge of the pool hardens to form the joint. Once a filler metal is necessary for enhanced bonding, the wire can be used outside of the material which is fed to the arc region, which dissolves & loads the weld pool. A filler metal's chemical composition is related to that of the workpiece.
23	What are the different types of arc welding	• Plasma Arc Welding • Metal Arc Welding • Carbon Arc Welding • Gas Tungsten Arc Welding • Gas Metal Arc Welding • Submerged Arc Welding • SMAW – Shielded Metal Arc Welding • FCAW (Flux Cored Arc Welding) • ESW (Electro-Slag Welding) • Arc Stud Welding
24	What is the metal arc welding?	The metal arc welding (MAW) process mainly uses a metal electrode for the welding process. This metal electrode can be either consumable otherwise non-consumable based on the requirement. Most of the used consumable electrode can be covered with flux, and the main benefit of this type of welding process is that it requires low temperature compared with others.
25	What is carbon arc welding?	The Carbon arc welding (CAW) process mainly uses a carbon rod like an electrode for welding the metal joint. This kind of arc welding is the oldest arc welding process and requires high current, low voltage for generating the arc. In some cases, an arc can be generated among two carbon electrodes which are named twin carbon arc welding.
26	What is gas metal arc welding?	Gas metal arc welding (GMAW) is also called Metal inert gas welding (MIGW). It uses a fresh metal electrode that is protected by gas like helium, argon, etc. These gases will protect the join area from oxidation and generates multiple welding material layers. In this type of arc welding process, a filler wire can be fed constantly using a non-consumable metal electrode for welding the metal.
27	What is FCAW?	This kind of welding is an alternative to shield metal arc welding. This flux-cored arc welding works with an electrode as well as a stable voltage power supply so that it provides a stable arc length. This method works by using a shielding gas or the gas which is formed through the flux to give safety from contagion.
28	What is Electronic Beam welding?	The EBM or Electronic beam welding is used to join metals wherever electron waves get fired up at high velocity for welding one metal surface to another. Once the electron wave strikes its objective, then the affected spot will melt just sufficient to combine the adjoining part into place. This kind of welding is very popular in the industrial area.

29	Mention other types of arc welding.	Atomic hydrogen welding Electroslag welding Carbon Arc welding Oxy-fuel welding Resistance spot welding
30	List few advantages of arc welding.	• Arc welding has high speed as well as welding efficiency • It includes a simple welding apparatus. • It is simply moveable. • Arc welding forms the physically powerful bond between the welded metals. • It provides reliable welding quality • Arc welding offers a superior welding atmosphere. • The power source of this welding is not costly. • This welding is a quick and consistent process. • The welder can utilize ordinary domestic current.
31	List few disadvantages of arc welding.	• A high expert operator is necessary to perform arc welding. • The rate of deposition can be incomplete as the electrode covering tends to burn and decrease • The length of the electrode is 35mm and needs electrode changing for the entire production rate. • These are not clean for reactive metals such as titanium & aluminum
32	List application of arc welding.	• Used in the weldings of sheet metals • For welding thin, ferrous & non-ferrous metals • Used to design pressure & pressure vessels • The developments of piping in industries • Used in the domains of automotive and home furnishing • Industries of Shipbuilding • Used in the manufacturer of aircraft & aerospace • Auto body restorations • Railroads
33	Describe the process of filling the tables of data.	This process typically requires filling tables with measurements, performing calculations and generating graphs with the collected data. Throughout this process, you will need to provide proper units and significant figures for each measurement in a table. To avoid confusion, it is useful to write all your measurements in the same units and make note of the units in the column header.
34	How can we depict our measurements in a manner that is easy to read, understand, and draw conclusions from?	Well-measured data, when poorly plotted, can lead to erroneous conclusions and be very confusing to someone reading your report. Even your future self will likely have difficulty interpreting your own report. Graphs (and charts) are very concise and useful methods of depicting a large amount of data. This portion of the lab outlines the necessary components for an informative graph.

2.PT=Practical Test

#	Activity to be performed	Activity to be evaluated and assessed
1	Student Assignments	Students need to undertake assignments related to develop a good basic knowledge of mechanical fittings practices prior to proceeding to the development of welding knowledge and skills, as they continue with the unit. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Identify and explain functions tools used in mechanical workshop ✓ Identify and explain properties of various pipes and their applications ✓ Use measuring instruments properly ✓ Undertake basic arc welding ✓ Perform basic workshop practices
3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Identify and explain functions tools used in mechanical workshop ✓ Identify and explain properties of various pipes and their applications ✓ Use measuring instruments properly ✓ Undertake basic arc welding ✓ Perform basic workshop practices
4	Demonstrate arc welding process with circuit.	The student is expected to follow the correct step-by step process to arc welding with circuit. The elements which should be assessed are: 1. The electric arc is glowing electrical discharge among two electrodes using ionized gas. 2. The electric arc winding circuit can be formed by an electric arc among the electrode as well as the workpiece. 3. The temperature of the arc may arrive at 5500°C (10000°F), which is enough to combine the edges of the workpiece. 4. The weld pool of the front edge dissolves the welded surface once the back edge of the pool hardens to form the joint. 5. Once a filler metal is necessary for enhanced bonding, the wire can be used outside of the material which is fed to the arc region, which dissolves & loads the weld pool.

3. OW =Observation at work Place

#	Activity to be observed	Evaluative Assessment of the observed activity
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Identify and explain functions tools used in mechanical workshop ✓ Identify and explain properties of various pipes and their applications ✓ Use measuring instruments properly ✓ Undertake basic arc welding ✓ Perform basic workshop practices
2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities related to the above areas or elements covered within the competency unit.
3	Student Assignments	During the implementation of the training program, students would have completed assignments related on developing a good basic knowledge of mechanical fittings practices. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Demonstrate how to assemble a flange joint	As the students attend the practical test to check their knowledge about flange joints and how to assemble them, make sure the student use the proper techniques and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Answers
1	Identify and explain functions tools used in mechanical workshop	Make sure the students answer questions related to the following areas ✓ Sketch and name tools used in the welding workshop ✓ Explain functions of the identified tools and scope of their use
2	Identify and explain properties of various pipes and their applications	Make sure the students answer questions related to the following areas ✓ Identify types of pipes used in plumbing and sewerage services ✓ Interpret functions and their application within plumbing and sewerage operations ✓ Demonstrate joining methods of the pipes ✓ Familiarize with fitting used on these different pipes

3	Use measuring instruments properly	Make sure the students answer questions related to the following areas ✓ Identify names and functions of various measuring instruments used in mechanical workshop ✓ Demonstrate use of various measuring instruments
4	Undertake basic arc welding	Make sure the students answer questions related to the following areas ✓ Apply general and electrical safety related to welding ✓ Observe safe connection of welding plants to electrical networks
5	Identify and explain properties of various pipes and their applications	Make sure the students answer questions related to the following areas ✓ Undertake marking out on metals ✓ Perform metal cutting using hack-saw ✓ Perform drilling holes on metal pieces ✓ Perform filing on metal pieces

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-10: Apply industrial electrical knowledge and skills

Unit No	10
Unit Title	Apply industrial electrical knowledge and skills
Unit Code	**CONS02CR03V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Apply basic electrical knowledge							
Apply the Concepts and Knowledge of the following ✓ Voltage ✓ Current ✓ Resistant ✓ Ohms Laws ✓ Electrical Circuit	✓	✓		✓	✓	✓	
Tools and equipment, including personal protective equipment, are selected and checked for serviceability	✓		✓	✓	✓		✓
Sustainability principles and concepts are applied	✓	✓	✓		✓	✓	✓
2. Lay and fix electrical conduits / trunking / ducts etc.,							
Locations of the electrical points identified and marked according to layout plan	✓	✓		✓	✓	✓	
Locations and directions of conduit/ trunking/ ducts etc marked according to the layout plan	✓		✓	✓	✓		✓
Walls chipped where necessary, for the burying of conduit according to its sizes and number of runs	✓	✓	✓		✓	✓	✓
Steel conduits, trunking/ducts etc selected, prepared and fixed in pre-identified locations, clamped firmly, paying attention to the sizes and number of cables/wires to be accommodated according to the wiring diagrams/ regulations/ standards	✓	✓		✓	✓	✓	
Conduit accessories firmly buried/ mounted at pre-identified locations, according to layout plan, at specified depths and heights for each electrical point in conformity with regulations/ standards	✓		✓	✓	✓		✓

3. Install and wire main electrical control and protective switch gear							
Main power control switch gear fixed/ mounted at preidentified locations, according to the layout plan / diagram	✓	✓		✓	✓	✓	
Stand by power supply equipment and change-over switchgear installed as per manufacturer's specifications	✓		✓	✓	✓		✓
Cables from the main power control switchgear to the main power supply/ transformers laid and terminated as specified/ detailed in the layout plan/ regulations/ standards	✓	✓	✓		✓	✓	✓
Earth electrodes installed and terminated at the pre-identified locations, in accordance with layout plan and conforming with regulations and standards	✓	✓		✓	✓	✓	
Installations tested for safe and optimum performance according to standards and MEA regulations	✓		✓	✓	✓		✓
4. Wire electrical final circuits							
Type and size of wires and cables selected for each final circuit referring to the wiring diagram/ standards	✓	✓		✓	✓	✓	
Wiring carried out in accordance with the wiring diagram/ layout plan and in conformity with standards and MEA regulations	✓		✓	✓	✓		✓
Electrical accessories in the final circuits mounted and wires terminated as per wiring diagrams	✓	✓	✓		✓	✓	✓
Special wiring for construction sites, temporary buildings, agricultural and historical sites carried out according to regulations and standards	✓	✓		✓	✓	✓	
Electrical installations in hazardous areas carried out according to regulations and standards	✓		✓	✓	✓		✓
Electrical appliances, equipment in final circuits fixed according to the wiring diagram/ standards	✓	✓	✓		✓	✓	✓
5. Wire electrical final circuits							
Trucking/ conduit/ ducts etc. for laying of power cables installed according to wiring diagrams	✓	✓		✓	✓	✓	
Earth electrodes for the stand by power supply installed and connected as per manufacturer's specifications/ regulations and standards	✓		✓	✓	✓		✓
Power changeover switchgear/ control and protective switchgear required for the stand by power supply installed and cables laid and terminated as per manufacturer's specifications/ regulations/ standards	✓	✓	✓		✓	✓	✓
Power changing over systems checked for correct phase sequence and performance	✓	✓		✓	✓	✓	

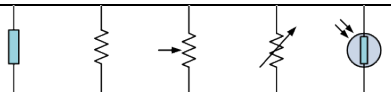
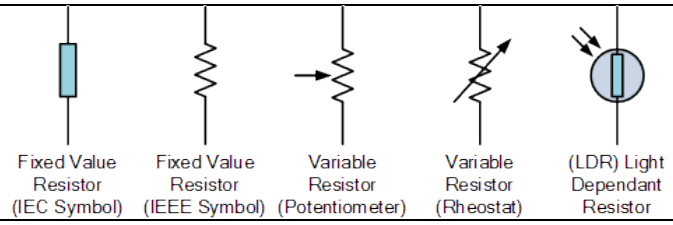
Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP=

Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play.

1. Written questions

#	Question	Answer
1	What is voltage?	Voltage, (V) is the potential energy of an electrical supply stored in the form of an electrical charge. Voltage can be thought of as the force that pushes electrons through a conductor and the greater the voltage the greater is its ability to "push" the electrons through a given circuit.
2	What is P.D?	Then the difference in voltage between any two points, connections or junctions (called nodes) in a circuit is known as the Potential Difference, (p.d.)
3	What is DC voltage & AC voltage?	A constant voltage source is called a DC Voltage with a voltage that varies periodically with time is called an AC voltage.
4	What is referred as voltage drop?	Voltage is always measured as the difference between any two points in a circuit and the voltage between these two points is generally referred to as the "**Voltage drop**".
5	What is electrical current?	Electrical Current, (I) is the movement or flow of electrical charge and is measured in Amperes, symbol i, for intensity). It is the continuous and uniform flow (called a drift) of electrons (the negative particles of an atom) around a circuit that are being "pushed" by the voltage source.
6	What is conventional current flow?	The movement of the positive charge (holes) around a closed circuit flowing from the positive terminal of the battery, through the circuit and returns to the negative terminal of the battery. This flow of current from positive to negative is generally known as conventional current flow.
7	Explain what electron current flow is.	The flow of electrons around the circuit is opposite to the direction of the conventional current flow being negative to positive. The actual current flowing in an electrical circuit is composed of electrons that flow from the negative pole of the battery (the cathode) and return back to the positive pole (the anode) of the battery. This is because the charge on an electron is negative by definition and so is attracted to the positive terminal. This flow of electrons is called **Electron Current Flow**.
8	What is current measured in and how is it defined?	Current is measured in **Amps** and an amp or ampere is defined as the number of electrons or charge (Q in Coulombs) passing a certain point in the circuit in one second, (t in Seconds).
9	What is resistance?	**Resistance**, (R) is the capacity of a material to resist or prevent the flow of current or, more specifically, the flow of electric charge within a circuit.
10	Name these resistor symbols	Answer:

		
11	How can you identify whether the circuit element is a good or bad conductor?	The amount of resistance a resistor has is determined by the relationship of the current through it to the voltage across it which determines whether the circuit element is a "good conductor" – low resistance, or a "bad conductor" – high resistance.
12	What is defined as semiconductor?	A "semiconductor" on the other hand such as silicon or germanium, is a material whose resistance is half way between that of a good conductor and a good insulator.
13	What is the use of semiconductor?	Semiconductors are used to make Diodes and Transistors etc.
14	What is conductance?	The reciprocal of resistance is called **Conductance**, symbol (**G**) and represents the ability of a conductor or device to conduct electricity.
15	What is Ohms law?	The relationship between the Voltage, Current and Resistance forms the basis of **Ohms Law**
16	How can you find the voltage?	[V = I x R] V (volts) = I (amps) x R (Ω)
17	How can you find the current?	[I = V ÷ R] I (amps) = V (volts) ÷ R (Ω)
18	How can you find the resistance?	[R = V ÷ I] R (Ω) = V (volts) ÷ I (amps)
19	What is electric circuit?	The system in which electric current can flow from the source to the load and then back to the other terminal of the source is referred to as an electric circuit.
20	What are the main parts of an ideal electric circuit?	5. Electrical sources for delivering electricity to the circuit and these are mainly electric generators and batteries 6. Controlling devices for controlling electricity and these are mainly switches, circuit breakers, MCBs, and potentiometer like devices etc. 7. Protection devices for protecting the circuit from abnormal conditions and these are mainly electric fuses, MCBs, switchgear systems. 8. Conducting path to carry electric current from one point to other in the circuit and these are mainly wires or conductors.
21	What are the basic properties of electric circuits?	• A circuit is always a closed path. • A circuit always contains at least an energy source which acts as a source of electrons. • The electric elements include uncontrolled and controlled source of energy, resistors, capacitors, inductors, etc. • In an electric circuit flow of electrons takes place from negative terminal to positive terminal. • Direction of flow of conventional current is from positive to negative terminal. • Flow of current leads to potential drop across the various elements.

22	What are the types of electric circuits?	1. Open circuit 2. Closed circuit 3. Short circuit 4. Series circuit 5. Parallel circuit
23	What is open circuit?	If due to disconnection of any part of an electric circuit if there is no flow of current through the circuit, is said to be an open circuited.
24	What is closed circuit?	If there is no discontinuity in the circuit and current can flow from one part to another part of the circuit, the circuit is said to be closed circuit.
25	What is short circuit?	If two or more phases, one or more phases and earth or neutral of AC system or positive and negative wires or positive or negative wires and earth of DC system touch together directly or connected together by a zero impedance path then the circuit is said to be short circuited.
26	What is series circuit?	When all elements of a circuit are connected one after another in tail to head fashion and due to which there will be only one path of flowing current then the circuit is called series circuit.
27	What is parallel circuit?	If components are connected in such a way that the voltage drop across each component is same then it is known as parallel circuit.
28	What is series parallel circuit?	An electrical circuit in which some of the elements are connected in series and some of the elements are connected in parallel is called a series parallel circuit. Most of the practical circuits are series parallel circuits.
29	What are the four steps of installing a concealed conduit electrical wiring system?	Step 1: Laying the electrical conduits in the slab Step 2: Laying the electrical conduits in the wall Step 3: Installation of Switch Boards Back Boxes Step 4: Installation of Distribution Boards
30	What is double-front installation?	In a double-front installation, the cubicles are positioned in a row next to and behind one another. The main feature of a double-front installation is its extremely economic design, since the branch circuits on both operating cubicles are supplied by one main busbar system only.
31	What are the active protective measures?	Measures such as high-quality insulation of live parts (for example, busbars), uniform and easy handling, integrated operator fault protection, and correct switchgear dimensioning prevent arcing faults and hence personal injuries.
32	What are the passive protective measures?	They increase operator and installation safety many times over. They include arcing-fault-proof hinge and lock systems, safe handling of withdrawable units or circuit-breakers only when the door is closed, and flap traps behind front air vents, arc barriers or an arcing fault detection system in combination with a fast interruption of arcing faults.
33	What followings should be considered for the equipment to	• The applicable device specifications

	be installed in switchgear assemblies?	• The suitability with regard to nominal data, in particular short-circuit strength and breaking capacity • The installation of current-limiting protective equipment might be necessary
34	What is a conductor?	Electrical cable is a wire that helps to conduct the current in the circuit. It is also called a conductor.
35	What are the two types of electrical cables used in electrical wiring?	Copper and Aluminum conductors
36	What are the six types of cables used in the electrical wiring based on the voltage rating?	1. Low tension (L.T) up to 1kV 2. High tension (H.T) up to 11kV 3. Super tension (S.T) 22kV to 33kV 4. Extra high tension (E.H.T) 33kV to 66kV 5. Oil Filled cables – 66kV to 132kV 6. Extra super voltage cables beyond 132kV
37	What are low tension cables?	For the low voltage system, we use low tension cables. Low tension cables are only capable for below 1000V.
38	What are the high tension cables?	1000V to 11kV rating used conductors are called high tension cables.
39	What are the three types of cables used in the domestic electrical construction areas?	1. Power Cables 2. Control Cables 3. Instrument Cables
40	What are power cables?	Which is the conductor used in the power transmitting that is called power cables.
41	Why we use control cables?	Control cables are used to control an electrical equipment system.
42	What are the four types of electrical wiring in the electrical installation?	1. Ring type wiring 2. Radial type electrical wiring 3. Final type electrical wiring 4. Distribution type electrical wiring
43	Explain the three types of category circuit.	1st Category Circuit: A circuit (other than a fire alarm or emergency lighting Circuit) operating at LV. 2nd Category Circuit: A circuit (other than a fire alarm or emergency lighting Circuit) which supplies telecommunications equipment (such as telephones, intruder alarms, data transmission, call bells, etc.). 3rd Category Circuit: a fire alarm or emergency lighting Circuit.
44	What are the 3 phases of color in an AC system?	3 Phases : **Red** – **Yellow** – **Blue** Neutral : **Black** Protective Earth : **Green** Protective Earth/Neutral : **Green**/**Yellow**
45	What are the 2 phases of color in DC system?	Positive pole (+) : **Black** Negative pole (-) : **Blue**(White)

46	Most generators are manufactured in four basic ratings. These ratings define the amount of time the generator is designed to operate. Ratings are clearly stamped on the generator identification tag. It is important to understand the ratings when understanding the setup of a facility. What are the features of Cummins generator ratings?	• Emergency Standby Power (ESP) - Used to supply power to a varying electrical load during a utility interruption • Limited-Time Running Power (LTP) - Used to supply power to a constant electrical load for limited operation • Prime Power (PRP) - Used to supply power to a varying electrical load for unlimited hours of operation • Base Load (Continuous) Power (COP) -Used to supply power to a constant load for unlimited hours of operation

2. PT=Practical Test

#	Questions	Answers
1	Student Assignments	Students need to undertake assignments related to apply industrial electrical knowledge and skills, as they continue with the unit. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Apply basic electrical knowledge ✓ Lay and fix electrical conduits / trunking / ducts etc. ✓ Install and wire main electrical control and protective switchgear ✓ Wire electrical final circuits ✓ Install wiring for standby power supplies
3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Apply basic electrical knowledge ✓ Lay and fix electrical conduits / trunking / ducts etc. ✓ Install and wire main electrical control and protective switchgear ✓ Wire electrical final circuits ✓ Install wiring for standby power supplies
4	Demonstrate the procedures of in installing a concealed conduit electrical wiring system?	The student is expected to follow the correct step-by step install a concealed conduit electrical wiring system. The elements which should be assessed are: ✓ Step 1: Laying the electrical conduits in the slab ✓ Step 2: Laying the electrical conduits in the wall ✓ Step 3: Installation of Switch Boards Back Boxes ✓ Step 4: Installation of Distribution Boards

3. OW =Observation at work Place

#	Questions	Answers
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Apply basic electrical knowledge ✓ Lay and fix electrical conduits / trunking / ducts etc. ✓ Install and wire main electrical control and protective switchgear ✓ Wire electrical final circuits ✓ Install wiring for standby power supplies
2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities related to the above areas or elements covered within the competency unit.
3	Student Assignments	During the implementation of the training program, students would have completed assignments related to apply industrial electrical knowledge and skills. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Demonstrate how to wire a series circuits	As the students attend the practical test to check their knowledge about wiring, make sure the student use the proper techniques and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Answers
1	Apply basic electrical knowledge	Make sure the students answer questions related to the following areas ✓ Apply the Concepts and Knowledge of the following • Voltage • Current • Resistant • Ohms Laws • Electrical Circuit
2	Lay and fix electrical conduits / trunking / ducts etc.	Make sure the students answer questions related to the following areas ✓ Locations of the electrical points identified and marked according to layout plan ✓ Locations and directions of conduit/ trunking/ ducts etc marked according to the layout plan

		✓ Walls chipped where necessary, for the burying of conduit according to its sizes and number of runs ✓ Steel conduits, trunking/ducts etc selected, prepared and fixed in pre-identified locations, clamped firmly, paying attention to the sizes and number of cables/wires to be accommodated according to the wiring diagrams/ regulations/ standards ✓ Conduit accessories firmly buried/ mounted at pre-identified locations, according to layout plan, at specified depths and heights for each electrical point in conformity with regulations/ standards
3	Install and wire main electrical control and protective switchgear	Make sure the students answer questions related to the following areas ✓ Main power control switch gear fixed/ mounted at preidentified locations, according to the layout plan / diagram ✓ Stand by power supply equipment and change-over switchgear installed as per manufacturer's specifications ✓ Cables from the main power control switchgear to the ✓ main power supply/ transformers laid and terminated as specified/ detailed in the layout plan/ regulations/ standards ✓ Earth electrodes installed and terminated at the pre-identified locations, in accordance with layout plan and conforming with regulations and standards ✓ Installations tested for safe and optimum performance according to standards and MEA regulations
4	Wire electrical final circuits	Make sure the students answer questions related to the following areas ✓ Type and size of wires and cables selected for each final circuit referring to the wiring diagram/ standards ✓ Wiring carried out in accordance with the wiring diagram/ layout plan and in conformity with standards and MEA regulations ✓ Electrical accessories in the final circuits mounted and wires terminated as per wiring diagrams ✓ Special wiring for construction sites, temporary buildings, agricultural and historical sites carried out according to regulations and standards ✓ Electrical installations in hazardous areas carried out according to regulations and standards ✓ Electrical appliances, equipment in final circuits fixed according to the wiring diagram/ standards

5	Install wiring for standby power supplies	Make sure the students answer questions related to the following areas ✓ Trunking/ conduit/ ducts etc. for laying of power cables installed according to wiring diagrams ✓ Earth electrodes for the stand by power supply installed and connected as per manufacturer's specifications/ regulations and standards ✓ Power changeover switchgear/ control and protective switchgear required for the stand by power supply installed and cables laid and terminated as per manufacturer's specifications/ regulations/ standards ✓ Power changing over systems checked for correct phase sequence and performance

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-11: Operate chemical separation equipment

Unit No	11
Unit Title	Operate chemical separation equipment
Unit Code	**CONS02CR04V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Prepare for work							
Identify work requirements	✓		✓	✓		✓	
Identify and control hazards	✓	✓	✓	✓	✓	✓	✓
Coordinate with appropriate personnel	✓	✓		✓	✓	✓	✓
2. Operate chemical separation equipment							
Identify the type of chemical separation equipment	✓		✓	✓		✓	
Start up and shut down chemical separation equipment according to type and duty	✓	✓	✓	✓	✓	✓	✓
Monitor plant frequently and critically throughout shift using measured/indicated data and senses (e.g. sight and hearing), as appropriate	✓	✓		✓	✓	✓	✓
Adjust flow and pressure as appropriate to type of separation equipment	✓		✓	✓		✓	
Complete routine checks, logs and paperwork, taking action on unexpected readings and trends	✓	✓	✓	✓	✓	✓	✓
3. Isolate and de-isolate plant							
Isolate plant	✓		✓	✓		✓	
Make safe for required work	✓	✓	✓	✓	✓	✓	✓
Check plant is ready to be returned to service	✓	✓		✓	✓	✓	✓
Prepare plant for return to service	✓		✓	✓		✓	

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play.

1. Written questions

	Question	Answer
1	Identify hazards among employers and workers?	• Collect and review information about the hazards present or likely to be present in the workplace. • Conduct initial and periodic workplace inspections of the workplace to identify new or recurring hazards. • Investigate injuries, illnesses, incidents, and close calls/near misses to determine the underlying hazards, their causes, and safety and health program shortcomings. • Group similar incidents and identify trends in injuries, illnesses, and hazards reported. • Consider hazards associated with emergency or nonroutine situations. • Determine the severity and likelihood of incidents that could result for each hazard identified, and use this information to prioritize corrective actions.
2	How to collect existing information about workplace hazards?	• Equipment and machinery operating manuals. • Safety Data Sheets (SDS) provided by chemical manufacturers. • Self-inspection reports and inspection reports from insurance carriers, government agencies, and consultants. • Records of previous injuries and illnesses, such as OSHA 300 and 301 logs and reports of incident investigations. • Workers' compensation records and reports. • Patterns of frequently-occurring injuries and illnesses.
3	How to inspect the workplace for safety hazards?	• Conduct regular inspections of all operations, equipment, work areas and facilities. Have workers participate on the inspection team and talk to them about hazards that they see or report. • Be sure to document inspections so you can later verify that hazardous conditions are corrected. Take photos or video of problem areas to facilitate later discussion and brainstorming about how to control them, and for use as learning aids. • Include all areas and activities in these inspections, such as storage and warehousing, facility and equipment maintenance, purchasing and office functions, and the activities of on-site contractors, subcontractors, and temporary employees. • Before changing operations, workstations, or workflow; making major organizational changes; or introducing new equipment, materials, or processes, seek the input of

		workers and evaluate the planned changes for potential hazards and related risks.
4	How to conduct incident investigation?	• Develop a clear plan and procedure for conducting incident investigations, so that an investigation can begin immediately when an incident occurs. The plan should cover items such as: o Who will be involved o Lines of communication o Materials, equipment, and supplies needed o Reporting forms and templates • Train investigative teams on incident investigation techniques, emphasizing objectivity and open-mindedness throughout the investigation process. • Conduct investigations with a trained team that includes representatives of both management and workers. • Investigate close calls/near misses. • Identify and analyze root causes to address underlying program shortcomings that allowed the incidents to happen.
5	How to accomplish on characterizing the nature of identified hazards?	• Evaluate each hazard by considering the severity of potential outcomes, the likelihood that an event or exposure will occur, and the number of workers who might be exposed. • Use interim control measures to protect workers until more permanent solutions can be implemented. • Prioritize the hazards so that those presenting the greatest risk are addressed first. Note, however, that employers have an ongoing obligation to control all serious recognized hazards and to protect workers.
6	Once the task statement has been defined the task analysis will then go into further details. Describe those details.	• task frequency • difficulty of learning • importance to train • task criticality • task difficulty • overall task importance
7	Define task steps?	Task steps (also known as performance steps) are the step-by-step instructions for performing the process. They describe each step in sequence.
8	What are the four main methods for determining the steps in a task analysis?	• Hierarchical Task Analysis - arranging by order of actions • IF and THEN Analysis - If and then relationship • Model Based Analysis - possible actions listed • Cognitive Task Analysis - critical decision based
9	What are the duties?	Duties are a combination of related or like tasks.

10	What is team task analysis?	A team task analysis includes teamwork and individual task-work. This is often called a collective task. Teamwork consists of individuals interacting or coordinating tasks that are important to the team's goals, while task-work consists of individuals performing tasks.
11	What are the three elements of coordinating with others?	• Clear communications • Understanding each other's personality types • Get organized
12	What are the 6 ways to improve your ability to coordinate with others?	1. Learn how to be a clear communicator. Check your team have understood you correctly. 2. Learn to be a better listener. 3. Learn how to give feedback. 4. Learn how to receive feedback. 5. Become better at managing deadlines. 6. Check-in regularly with your team to find out how they are progressing with their individual tasks.
13	The operation and maintenance of water and wastewater plants has been generally been broken up in to five main critical elements. What are those 5 elements?	Operation, maintenance, engineering, training and administration – also known as OMETA.
14	What is scope of service?	This is primarily a communication tool between the company and its employees, customer and contractors, to ensure that relevant site information is regularly updated between all parties and that safety is monitored, recorded and acted upon.
15	What is operations plan and the benefits?	This is the primary main operational objective which is to make sure the plant is operating in producing the design quality and quantity efficiently and consistently. Benefits (why it matters): ✓ Enhance tracking and decision making and control of KPIs; ✓ Provide optimal operating efficiency; ✓ Reduce waste; ✓ Support proactive operation; ✓ Support continuous process improvement and optimization; and ✓ Reduce operating errors
16	What are the things that an operation plan should include?	• Operating Schedules; • Operating KPIs; • Data collection and monitoring; • Responses with corrective actions; • Standard Operating Procedures (SOP); • Work Instructions; • Checklists / Task Lists; • Operator Logs; • Product / Process Change Processes

17	Write important factors about data logging.	• When and what data is collected; • How often it is collected depends on the criticality of the process; • Using online or manually collected data; • Transferring data into information summarized by KPIs; • Using the information to control and correct deviations; and • Consult with the equipment manufacturer.
18	State the benefits of communication & reporting.	• Forms basis for measurable business value • Provides mutual agreement of value delivered • Allows tracking and implementation of Best Standard Operation procedures • Fulfilling regulatory requirements • Identifies opportunities for improvement and expansion
19	What consists of administration and benefits?	Procurement Contracts management Budgeting Book keeping Public communication **Benefits (why it matters)** Effective management Control of KPIs Support meting regulatory and contractual requirement Better public awareness Provide a documents repository
20	Describe the shift handover procedure	To ensure continuity and minimize errors, a standard procedure is implemented for shift handover. Each company will develop their own procedure in line with their operational requirements. In practice we have observed that there is little standardization of these handover procedures between companies, and while some follow a very rigorous and defined process, others merely rely on individuals to communicate effectively.
21	State 3 ways how a moving machinery can cause injuries.	• People can be struck and injured by moving parts of machinery or ejected material. Parts of the body can also be drawn in or trapped between rollers, belts and pulley drives. • Sharp edges can cause cuts and severing injuries, sharp-pointed parts can cause stabbing or puncture the skin, and rough surface parts can cause friction or abrasion. • People can be crushed, both between parts moving together or towards a fixed part of the machine, wall or other object, and two parts moving past one another can cause shearing.
22	A worker received crush injuries to his head and neck while he was undertaking maintenance work, when the hoist he was	The power supply to the hoist had not been isolated before work started. This was because workers had not been given adequate training or instruction on safe isolation procedures. It was also found that isolation by the interlocked gates could be bypassed.

	working on started up. What caused the accident?	
23	Maintenance staff removed a section of grating to gain access to plant located below a walkway. A worker fell through a gap in the walkway, seriously injuring his shoulder. What caused the accident?	The fall happened because there was nothing to make workers aware of the dangers caused by machinery maintenance. Barriers, guards and signs should have been used to indicate that maintenance was taking place.
24	Describe safe isolation.	• Ensuring moving plant has stopped and isolate electrical and other power supplies. Most maintenance should be carried out with the power off. If the work is near uninsulated, overhead electrical conductors, e.g. close to overhead travelling cranes, cut the power off first. • Locking off machines if there is a chance the power could be accidentally switched back on. • Isolating plant and pipelines containing pressured fluid, gas, steam or hazardous material. Locking off isolating valves.
25	What are the aims of an isolation procedure?	• isolate all forms of potentially hazardous energy to ensure that an accidental release of hazardous energy does not occur • control all other hazards to those doing the work • ensure that entry to a restricted area is tightly controlled.
26	What is the most effective isolation procedure?	• shut down the machinery and equipment • identify all energy sources and other hazards • identify all isolation points • isolate all energy sources
27	What should we consider when using locks or danger tags?	• tags should be dated and signed • locks should be accompanied by a corresponding tag to identify who has locked out the plant • tags and locks should only be removed by the person who applied them or by the supervisor after consultation with the signatory of the danger tag. In the event • that the person who applied the danger tag is unavailable, their tag or lock may only be removed in accordance with a management approved procedure • danger Tags and/or locks should be fitted to all isolation points.
28	What is the purpose of out of service tags?	Out-of-service tags are used to identify equipment or machinery that has been taken out of service due to a fault, damage or malfunction.
29	How is out of service tag removed by?	The out-of-service tag may be removed by: • the person who attached it • the supervisor responsible for the operation or repair of the equipment • the maintenance person who carried out the repairs.

2. PT=Practical Test

#	Questions	Answers
1	Student Assignments	Students need to undertake assignments related to range of separation equipment which rely on a phase change or chemical change to enact the separation, as they continue with the unit. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Prepare for work ✓ Operate chemical separation equipment ✓ Isolate and de-isolate plant
3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Prepare for work ✓ Operate chemical separation equipment ✓ Isolate and de-isolate plant
4	Demonstrate on conducting an incident investigation?	The student is expected to follow the correct step-by step process to proportion and mix concrete. The elements which should be assessed are: ✓ Develop a clear plan and procedure for conducting incident investigations ✓ Train investigative teams on incident investigation techniques. ✓ Conduct investigations with a trained team that includes representatives of both management and workers. ✓ Investigate close calls/near misses. ✓ Identify and analyze root causes to address underlying program shortcomings that allowed the incidents to happen.

3. OW =Observation at workplace

#	Questions	Answers
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Prepare for work ✓ Operate chemical separation equipment ✓ Isolate and de-isolate plant

2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities related to the above areas or elements covered within the competency unit.
3	Student Assignments	During the implementation of the training program, students would have completed assignments related to range of separation equipment which rely on a phase change or chemical change to enact the separation. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Demonstrate on how to collect existing information about workplace hazards	As the students attend the practical test to assess the knowledge, location and skills to collect secondary information, make sure the student use the proper protocols and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Answers
1	Prepare for work	Make sure the students answer questions related to the following areas ✓ Identify work requirements ✓ Identify and control hazards ✓ Coordinate with appropriate personnel
2	Operate chemical separation equipment	Make sure the students answer questions related to the following areas ✓ Identify the type of chemical separation equipment ✓ Start up and shut down chemical separation equipment according to type and duty ✓ Monitor plant frequently and critically throughout shift using measured/indicated data and senses (e.g. sight and hearing), as appropriate ✓ Adjust flow and pressure as appropriate to type of separation equipment ✓ Complete routine checks, logs and paperwork, ✓ taking action on unexpected readings and trends
3	Isolate and de-isolate plant	Make sure the students answer questions related to the following areas ✓ Isolate plant ✓ Make safe for required work ✓ Check plant is ready to be returned to service ✓ Prepare plant for return to service

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-12: Operate and maintain water treatment plant

Unit No	12
Unit Title	Operate and maintain water treatment plant
Unit Code	**CONS02CR05V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Prepare for work							
Receive and give shift handover	✓		✓	✓		✓	
Identify work requirements	✓	✓	✓	✓	✓	✓	✓
Identify and control hazards	✓	✓		✓	✓	✓	✓
Coordinate with appropriate personnel	✓		✓	✓		✓	
Check for recent work undertaken on filter	✓	✓	✓	✓	✓	✓	✓
Note any outstanding/incomplete work	✓	✓		✓	✓	✓	✓
Check operational status of plants	✓		✓	✓		✓	
2. Operate water treatment plant							
Identify the types of filter and its duty	✓		✓	✓		✓	
Apply theoretical knowledge related to water treatment plant operation	✓	✓	✓	✓	✓	✓	✓
Complete routine checks, logs and paperwork taking action in accordance with procedures on unexpected readings	✓	✓		✓	✓	✓	✓
Handling materials and substances	✓		✓	✓		✓	
3. Operate distribution system							
Maintain set pressure	✓		✓	✓		✓	
Complete routine checks, logs and paperwork taking action in accordance with procedures on unexpected readings	✓	✓	✓	✓	✓	✓	✓
4. Recognise and take action on abnormal situations in accordance with procedures							
Monitor plant frequently and critically throughout shift using measured/indicated data and senses	✓		✓	✓		✓	
Identify impacts of any changes upstream and downstream	✓	✓	✓	✓	✓	✓	✓
Recognise situations which may require action	✓	✓		✓	✓	✓	✓
Resolve routine problems	✓		✓	✓		✓	

Take actions on other abnormal situations to make safe and have the situation resolved	✓	✓	✓	✓	✓	✓	✓
5. Isolate and de-isolate plant							
Complete any required pre-start checks	✓		✓	✓		✓	
Startup/shut down/changeover plant according to the plant type and duty in liaison with other personnel	✓	✓	✓	✓	✓	✓	✓
Isolate Plant	✓	✓		✓	✓	✓	✓
Make safe for required work	✓		✓	✓		✓	
Check Plant is ready to be returned to service	✓	✓	✓	✓	✓	✓	✓
De-isolate and prepare Plant for return to service	✓	✓		✓	✓	✓	✓
6. Perform log taking and document management							
Identify types and function of logs and documents required	✓		✓	✓		✓	
Undertake recording of logs and management of documents	✓	✓	✓	✓	✓	✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play.

1. Written questions

#	Question	Answer
1	Define reverse osmosis?	Reverse osmosis is the process of forcing a solvent from a region of high solute concentration through a membrane to a region of low solute concentration by applying a pressure in excess of the osmotic pressure.
2	What is called membrane fouling?	The process of formation of a deposited layer on a membrane surface is called membrane fouling and results in performance decline of the RO system.
3	What is the objective of feed water pretreatment process?	The objective of the feed water pre-treatment process is to improve the quality of the feed water to the level which would result in reliable operation of the RO membranes.
4	Based on the raw water quality, the pre-treatment process for RO Plants there is process which needs to be followed. What consists in the treatment steps?	• Clarification followed by Sand Filtration for Turbidity removal • Water disinfection with chlorine • Hardness reduction by Softening • Addition of scale inhibitor • Reduction of free chlorine using sodium bisulfite/ Activated carbon filters • Final removal of suspended particles using cartridge filters
5	What are the main features of RO plants?	• Powder coated frame • 20 & 5 micron sediment pre-filter • Stainless Steel Multistage High pressure pump • FRP pressure vessel • Product and Reject Flow Meters • Low & High pressure switch • High rejection TFC membranes • Heavy duty high pressure tubing

6	What may consists of a packaged drinking water plant?	Water Treatment Plant Packaging Plant
7	What does a water treatment plant will consists of mostly?	Chlorine/Hypochlorite Dosing System Chlorine/Hypo chlorite dosing system is done in the raw water for disinfection / oxidation of iron and manganese (if present) in the water before filtration. Sodium hypo chlorite reacts with water to form hypo chlorite acids which acts as disinfecting agent.
8	What does a proactive operation schedules include?	Proactive operation schedules include seasonal changes, shutdown periods, peak demand, low consumption periods, water quality changes and public holidays are all important factors to monitor and manage to increase overall plant efficiency.
9	What are important factors about data logging?	• When and what data is collected; • How often it is collected depends on the criticality of the process; • Using online or manually collected data; • Transferring data into information summarized by KPIs; • Using the information to control and correct deviations; and • Consult with the equipment manufacturer.
10	State design principles that should be in a good shift procedure.	• Formal written communication around each handover should be documented in a simple, secure, structured logbook, ideally electronic. • Information between shifts should also communicate the "why" and not just the "what". • Information between shifts should be communicated between experienced competent persons who understand the process and work being done.
11	What is the function of reservoirs?	The reservoir stores water for higher demand flows, such as for fire emergencies, and peak domestic flows, such as when people are getting ready for work in the morning and returning home later in the day. The reservoir also acts as a buffer in maintaining constant flow and pressure of water in the distribution system.
12	What are common factors that could be caused due to loss of chlorine residual?	• Source water quality: Water that is high in organic or inorganic matter will use up the chlorine residual faster than water that is lower in organic matter. • Residency time: The more time the water spends in storage and distribution, the more chlorine residual is used up. Long residency time can result from low water usage, dead ends in the distribution system and poor turnover in the reservoir. • Reaction with pipe materials: Some pipe materials (e.g., iron) can react with chlorine, resulting in loss of the residual. • Biofilm growth: Biofilm is a large colony of microorganisms that grown on pipe walls within the distribution system that will use up the chlorine residual.
13	Explain briefly about timing of maintenance.	Hydrants and valves should be evaluated and exercised at a minimum once per year. If a hydrant is used, it should be evaluated afterwards. Backup generators should be tested each month.

		Pumps should undergo maintenance as per the manufacturer's recommendation. Dead end mains should be flushed on a routine basis to maintain water quality. Water reservoirs should be evaluated annually and cleaned every 3 to 5 years, based on sediment collection on the bottom.
14	Explain water metering.	Water metering establishes a user pay system, which ensures equity and fairness for water consumers. If a water system is unmetered and users pay a flat rate, there may be inequity if a neighbour uses more water for their green house and swimming pool and another one uses only water within the home.
15	What does AOCs stand for?	Abnormal Operating Conditions (AOCs).
16	Mention issues related to AOCs?	• Lack of a clear definition of AOCs • Same AOCs occurring repeatedly • Controllers unable to respond to AOCs in a timely manner • AOCs not recorded properly in the SCADA system • Lack of tools to review and analyze AOCs

2. PT=Practical Test

#	Practical Activity	Additional Details
1	Student Assignments	Students need to undertake assignments related to operate Water Treatment Plant and distribution system, as they continue with the unit. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Prepare for work ✓ Operate water treatment plant ✓ Operate distribution system ✓ Recognize and take action on abnormal situations in accordance with procedures ✓ Isolate and de-isolate plant ✓ Perform log taking and document management
3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Prepare for work ✓ Operate water treatment plant ✓ Operate distribution system ✓ Recognize and take action on abnormal situations in accordance with procedures ✓ Isolate and de-isolate plant ✓ Perform log taking and document management
4	Demonstrate water metering procedure.	The student is expected to follow the correct step-by step process on water metering The elements which should be assessed are:

		✓ Ensure the equity and fairness for water consumers. ✓ If a water system is unmetered and users pay a flat rate.

3. OW =Observation at work Place

#	Observation Area	Additional details of the observation
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Prepare for work ✓ Operate water treatment plant ✓ Operate distribution system ✓ Recognize and take action on abnormal situations in accordance with procedures ✓ Isolate and de-isolate plant ✓ Perform log taking and document management
2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities related to the above areas or elements covered within the competency unit.
3	Student Assignments	During the implementation of the training program, students would have completed assignments related to operate Water Treatment Plant and distribution system. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Demonstrate how to use ultra violet sterilizer	As the students attend the practical test to check their skill in utilizing UV sterilizer, make sure the student use the proper techniques and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Assess and evaluating parameters
1	Prepare for work	Make sure the students answer questions related to the following areas ✓ Receive and give shift handover ✓ Identify work requirements ✓ Identify and control hazards ✓ Coordinate with appropriate personnel ✓ Check for recent work undertaken on filter ✓ Note any outstanding/incomplete work ✓ Check operational status of plants

2	Operate water Treatment Plant	Make sure the students answer questions related to the following areas ✓ Identify the types of filter and its duty ✓ Apply theoretical knowledge related to water treatment plant operation ✓ Complete routine checks, logs and paperwork taking action in accordance with procedures on unexpected readings ✓ Handling materials and substances
3	Operate distribution system	Make sure the students answer questions related to the following areas ✓ Maintain set pressure ✓ Complete routine checks, logs and paperwork taking action in accordance with procedures on unexpected readings
4	Recognize and take action on abnormal situations in accordance with procedures	Make sure the students answer questions related to the following areas ✓ Monitor plant frequently and critically throughout shift using measured/indicated data and senses ✓ Identify impacts of any changes upstream and downstream ✓ Recognise situations which may require action ✓ Resolve routine problems ✓ Take actions on other abnormal situations to make safe and have the situation resolved
5	Isolate and de-isolate plant	Make sure the students answer questions related to the following areas ✓ Complete any required pre-start checks ✓ Startup/shut down/changeover plant according to the plant type and duty in liaison with other personnel ✓ Isolate Plant ✓ Make safe for required work ✓ Check Plant is ready to be returned to service ✓ De-isolate and prepare Plant for return to service
6	Perform log taking and document management	Make sure the students answer questions related to the following areas ✓ Identify types and function of logs and documents required ✓ Undertake recording of logs and management of documents

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-13: Monitor systems and equipment

Unit No	13
Unit Title	Monitor systems and equipment
Unit Code	**CONS02CR06V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Prepare for work							
Identify work requirements	✓		✓	✓		✓	
Identify and control hazards	✓	✓	✓	✓	✓	✓	✓
Coordinate with appropriate personnel	✓	✓		✓	✓	✓	✓
2. Startup systems / equipment							
Perform pre-start-up checks	✓		✓	✓		✓	
Check the status of the system/equipment prior to commencing start-up process	✓	✓	✓	✓	✓	✓	✓
Check all required auxiliary systems, including oil and water, to confirm their operational condition	✓	✓		✓	✓	✓	✓
Startup individual items of equipment and the entire system as required	✓		✓	✓		✓	
Bring the system to required operating condition	✓	✓	✓	✓	✓	✓	✓
3. Control and monitor the system							
Initiate load-up through the selection of appropriate speed or cycle	✓		✓	✓		✓	
Monitor and adjust downstream equipment as required	✓	✓	✓	✓	✓	✓	✓
Monitor the operational condition and safety status of the unit/system and take appropriate action	✓	✓		✓	✓	✓	✓
Adjust operational speeds and operating cycles as required	✓		✓	✓		✓	
Monitor or activate safety systems to ensure that any system shutdowns are controlled and conducted safely and effectively	✓	✓	✓	✓	✓	✓	✓
4. Shut down systems/equipment							
Confirm shutdown cause with other personnel and plant operators before commencing to isolate or shut down the equipment/system	✓		✓	✓		✓	

Implement control measures to minimise damage and hazards	✓	✓	✓	✓	✓	✓	✓
Shut down system according to procedures	✓	✓		✓	✓	✓	✓
Inspect the system/equipment as required by procedures	✓		✓	✓		✓	
Isolate and purge systems/equipment and prepare plant for maintenance as required.	✓	✓	✓	✓	✓	✓	✓
5. Maintain plant effectiveness							
Frequently and critically monitor all plant throughout shift	✓		✓	✓		✓	
Use measured/indicated data and smell, sight, sound and feel as appropriate to monitor plant	✓	✓	✓	✓	✓	✓	✓
Identify critical equipment/processes and tune their performance	✓	✓		✓	✓	✓	✓
Identify issues likely to impact on plant performance and take appropriate action	✓		✓	✓		✓	
Predict impact of a change in one unit/area on other plant units/areas and communicate this to relevant people	✓	✓	✓	✓	✓	✓	✓
Test trips and alarms as required	✓	✓		✓	✓	✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play.

1. Written questions

#	Question	Answer
1	What are the three stages of pre-start check on a machine?	Step 1 - Visual inspections of important features prior to starting the machine Step 2 - Visual & function tests while the machine is turned on but stationary Step 3 - Testing the machine's functions during a short drive
2	What are the important checks that needs to be made while the engine is off?	• Inspect Hydraulic Lifts & Tilt Rams (if applicable) - are these lubricated and carry no damage? • Battery - are the bracket terminals secure and clean? • Are the battery electrolyte levels correct and caps in place? • Is the battery charge sufficient for a day's work?
3	What are the general functions that should be checked in all machines?	• Horn - does it work? And is there any issue with its volume? • Hand Controls - do they operate correctly? • Foot Pedals - are they clean and do they operate correctly? • Control Panel - are there any issues with warning indicators, lights and gauges? • Reversing Beeper - does the machine operate in reverse? And do the beepers work? • Lights - do they work? Can they operate on spot or drive mode? • Rotating Warning Light - is it operational? • Park Break - does it hold the machine on an incline?

4	Mention the five necessary steps to improve the safety of a standard production facility.	• Ongoing safety- focused training • High-performing asset is a safe asset • Keep your facility tidy and organized • Review your facility's layout for any dangers • Routine machinery and building safety checks
5	Explain the 5 routine machinery and building safety checks.	Scheduled safety checks are key. Set a date at the beginning or end of the month and devote a large portion of the day to evaluate the following: ✓ Employees are using protective equipment at all times. ✓ Daily proactive maintenance checks are being performed. ✓ Walkways and stairwells are free of debris. ✓ Emergency exits are unlocked and easily accessible. ✓ Stray cords are put away. ✓ Liquids are dried and cleaned from all surfaces. ✓ All chipped concrete or holes have been covered or smoothed out.
6	Explain the step ongoing safety-focused training.	All new machine operators and maintenance technicians should have a mandatory training process so they can be eased into using and maintaining complex assets. This requires each employee to go through the same safety training exercises using each machine at the facility. Even if one has been working at the plant for a long time, machines are constantly changing as technology evolves. Schedule a few days each year with your employees and conduct the necessary training to ensure everyone stays up to date with the safest way to use the equipment.
7	What are the key drivers of plant maintenance shut-down?	• Improve equipment to reduce waste in manufacturing resources, thus reducing operating costs. • Improve overall equipment effectiveness (OEE). • Maintenance equipment to sustain its equipment life cycle. • Maintenance equipment to improve mean time between failure (MTBF). • Equipment inspection. • Equipment repair. • Replacement of worn equipment. • Replacement of broken equipment. • Replace depreciated equipment (ie: Equipment that has reached the end of its useful life). • Ensure compliance with health & safety codes.
8	How can you maintain a plant during a shutdown preparation?	Develop plans for how the maintenance will be performed, prior to project execution. To reinforce the improvements being made, consider adjusting the company's environmental, health and safety plans. Analyze the different manufacturing

		departments to determine if they can be optimized or otherwise improved in any way. Determine the logistics on what materials are needed for the shut-down project, when they will arrive on-site, how they will arrive on-site, and who will be working on this equipment during the shut-down. Make sure equipment and materials are ordered early, so that the shut-down is not delayed. Consider how the equipment and materials will be stored until they are called upon during shut-down.
9	During the phase IV (startup and & turn over) what are the parts that need to be followed?	• Handoff • Ramp up • Punch list • Evaluation
10	Explain the Phase IV (startup and & turn over) step 3.	Once the shut-down team and the operations team are satisfied with the results of the shut-down, the shut-down team does a final walk-through to assess what tasks on the project list were completed, and which ones were not. Because of budgetary issues and un-predictable issues, it's nearly impossible to finish all items on the punch list. However, by determine what items were not complete during this shut-down, it creates a starting point when planning the next system shut-down.
11	Explain demobilizing the worksite.	Demobilize the work site: Plan the logistics for returning any external resources or equipment. Determine how unused resources will be disposed. Clean the work site to prepare it for operations. Get rid of the equipment removed from the system. Tear down any trailers/offices constructed for the purpose of the maintenance shut-down (ie: Those assembled to house external work teams).
12	What is OEE?	Overall equipment effectiveness (OEE) is a term used to evaluate how efficiently a manufacturer's operation is being used. In other words, overall equipment effectiveness helps you notice a problem in your operations, identify which percentage of manufacturing time is actually productive and fix it while giving you a standardized gauge for tracking progress.
13	What is the purpose of OEE?	Overall equipment effectiveness is used as a benchmark to compare any given production to industry standards, in-house equipment or other shifts working on the same piece of equipment.
14	How is Standard OEE benchmarks followed as?	• An OEE score of 100 percent is considered perfect production, meaning you're only manufacturing quality parts as quickly as possible with no downtime. • An OEE score of 85 percent is considered world class for discrete manufacturers and is a sought-after long-term goal. • An OEE score of 60 percent is typical for discrete manufacturers and shows there is considerable room for improvement. • An OEE score of 40 percent is considered low but not uncommon for manufacturers just starting to track and improve performance. In most cases, a low score can easily be improved through easy-to-apply measures.
15	Overall Equipment Effectiveness is not	• Target - A real-time production target

	only a great tool for managers but can have a significant impact on employees working the plant floor. What are the plant floor metrics that includes?	• Actual - The actual production count • Efficiency - The ratio of target to actual; the percentage of how far ahead or behind production is • Downtime - This includes all unplanned stoppage time for each shift and is updated in real-time.
16	Define effectiveness with an example?	Effectiveness is the relationship between what could technically be produced and what is actually produced at the end of a production period. For example, if your machinery is capable of making 100 products an hour and it only makes 80, then it is 80 percent effective.
17	What are the main two ways to calculate OEE?	• Simple Calculation: The easiest way to calculate OEE is the ratio of fully productive time to planned production time. It looks like this: OEE = (Good Count x Ideal Cycle Time) / Planned Production Time. • Preferred Calculation: This type of OEE calculation is based on the three OEE factors discussed earlier – availability, performance and quality (good count). It looks like this: Availability x Performance x Quality = OEE. This is the preferred calculation method because not only do you get your OEE score showing how well you're doing, but you get three numbers (availability, performance and quality) showing what caused your losses.
18	What Are the Six Big Losses When It Comes to Overall Equipment Effectiveness (OEE)?	**Availability Loss** — **Equipment Failure** Setup and Adjustments **Performance Loss** — Idling and Minor Stops Reduce Speeds **Quality Loss** — Process Defects Reduced Yield
19	Explain briefly about available losses.	• Equipment Failure: This is equipment that is not running when it is scheduled for production, causing unplanned downtime. Machine breakdowns, unplanned maintenance stops and tooling failure are common examples. • Setup and Adjustments: This is production downtime due to changeovers, machine and tooling adjustments, planned maintenance, inspections and setup/warmup time.
20	Explain briefly about performance losses.	• Idling and Minor Stops: Sometimes called small stops, idling and minor stops are when equipment stops for a short period of time. This can be caused by jams, flow obstructions, wrong settings or cleaning. These issues are usually resolved by the operator. • Reduced Speed: Sometimes referred to as slow cycles, reduced speed is when equipment runs at speeds slower than the ideal cycle time (the fastest possible time). Worn out or poorly maintained equipment due to poor lubrication

		practices, substandard materials and bad environmental conditions are common causes of reduced speed.
21	Explain briefly about quality losses.	• Process Defects: This refers to any defective part manufactured during stable production, including scrapped parts and parts that can be reworked. Incorrect machine settings and operator or equipment errors are common reasons for process defects. • Reduced Yield: Reduced yield refers to defective parts made from startup until stable production is achieved. Like process defects, this can mean scrapped parts and parts that can be reworked. Reduced yield most commonly occurs after changeovers, incorrect settings and during machine warmups.
22	Write three benefits of using OEE.	• Increase Competitiveness: Manufacturers always strive to reduce losses during production to achieve maximum competitiveness. Using data from an OEE report helps you identify bottlenecks or weaknesses in production, allowing you to take immediate action. • Quality and competitiveness go hand-in-hand, and OEE's quality metric can help you identify problems in production causing scrap or rework parts. • Cutting Machinery Costs: An OEE strategy helps you understand your equipment's actual performance so you know whether it is working efficiently. It also alerts you to issues that may lead to future breakdowns and repairs. Overall equipment effectiveness lets you anticipate potential machine failure, reducing maintenance costs and downtime.

2. PT=Practical Test

#	Practical Activity	Additional details related to the activity
1	Student Assignments	Students need to undertake assignments related to operation and monitoring of a complex compressor system and associated equipment, as they continue with the unit. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Prepare for work ✓ Startup systems/equipment ✓ Control and monitor the system ✓ Shut down systems/equipment

		✓ Maintain plant effectiveness
3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Prepare for work ✓ Startup systems/equipment ✓ Control and monitor the system ✓ Shut down systems/equipment ✓ Maintain plant effectiveness
4	Demonstrate on how to plan for plant maintenance shutdown	The student is expected to follow the correct step-by step process on shutting down the plant maintenance. The elements which should be assessed are: ✓ Phase I: Define and Implement Strategies for Plant Maintenance Shut-Down ✓ Phase II: Plant Maintenance Shut-Down Preparation ✓ Phase III: Execution of the Project ✓ Phase IV: Start Up & Turn Over ✓ Phase V: Evaluation

3. OW =Observation at work Place

#	Activity to observe	Additional details
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Prepare for work ✓ Startup systems/equipment ✓ Control and monitor the system ✓ Shut down systems/equipment ✓ Maintain plant effectiveness
2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities related to the above areas or elements covered within the competency unit.
3	Student Assignments	During the implementation of the training program, students would have completed assignments related to operation and monitoring of a complex compressor system and associated equipment. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Demonstrate how to ramp up in the phase IV (startup and turn over)	As the students attend the practical test to check their skill in while on this phase IV during the Part II (Ramp up), make sure the student use the proper techniques and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Answers
1	Prepare for work	Make sure the students answer questions related to the following areas ✓ Identify work requirements ✓ Identify and control hazards ✓ Coordinate with appropriate personnel
2	Startup systems/equipment	Make sure the students answer questions related to the following areas ✓ Perform pre-start-up checks ✓ Check the status of the system/equipment prior to commencing start-up process ✓ Check all required auxiliary systems, including oil and water, to confirm their operational condition ✓ Startup individual items of equipment and the entire system as required ✓ Bring the system to required operating conditions.
3	Control and monitor the system	Make sure the students answer questions related to the following areas ✓ Initiate load-up through the selection of appropriate speed or cycle ✓ Monitor and adjust downstream equipment as required ✓ Monitor the operational condition and safety status of the unit/system and take appropriate action ✓ Adjust operational speeds and operating cycles as required ✓ Monitor or activate safety systems to ensure that any system shutdowns are controlled and conducted safely and effectively.
4	Shut down systems/equipment	Make sure the students answer questions related to the following areas ✓ Confirm shutdown cause with other personnel and plant operators before commencing to isolate or shut down the equipment/system ✓ Implement control measures to minimise damage and hazards ✓ Shut down system according to procedures ✓ Inspect the system/equipment as required by procedures ✓ Isolate and purge systems/equipment and prepare plant for maintenance as required.
5	Maintain plant effectiveness	Make sure the students answer questions related to the following areas

		✓ Frequently and critically monitor all plant throughout shift ✓ Use measured/indicated data and smell, sight, sound and feel as appropriate to monitor plant ✓ Identify critical equipment/processes and tune their performance ✓ Identify issues likely to impact on plant performance and take appropriate action ✓ Predict impact of a change in one unit/area on other plant units/areas and communicate this to relevant people ✓ Test trips and alarms as required

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-14: Collect samples and perform basic water tests

Unit No	14
Unit Title	Collect samples and perform basic water tests
Unit Code	**CONS02CR07V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Prepare for sampling							
Confirm the purpose, priority and scope of the sampling request		✓	✓		✓	✓	✓
Liaise with relevant personnel to arrange site access and all necessary clearances/permits	✓	✓		✓	✓		✓
Identify site hazards and review workplace safety procedures	✓	✓	✓		✓	✓	
Confirm what samples are to be collected, from where, how and when		✓	✓		✓	✓	✓
Assemble all specified sampling equipment, safety equipment, materials and containers	✓	✓		✓	✓		✓
Conduct pre-use and cleanliness checks of all items to ensure they are fit for purpose	✓	✓	✓		✓	✓	
Check all items against given inventory and stow them to ensure safe transport		✓	✓		✓	✓	✓
2. Collect sampling							
Locate sampling points and services at the site		✓	✓		✓	✓	✓
Remove security devices, such as locks and covers as required	✓	✓		✓	✓		✓
Seek advice if the required samples cannot be collected or if procedures require modification	✓	✓	✓		✓	✓	
Select and use required sampling equipment in accordance with given procedures		✓	✓		✓	✓	✓
Closely follow sampling procedures to obtain required samples and maintain their integrity	✓	✓		✓	✓		✓
Record all labelling information in accordance with workplace/legal traceability requirements	✓	✓	✓		✓	✓	
Record sample appearance, environmental conditions and any other factors that may impact on sample integrity		✓	✓		✓	✓	✓

Replace security devices, such as locks and covers as required	✓	✓		✓	✓		✓
3. Perform basic water test							
Identify daily water tests to be performed aligned to EPA standard.		✓	✓		✓	✓	✓
Perform basis water tests	✓	✓		✓	✓		✓
4. Update documentation							
Record log of the tests performed including their results.		✓	✓		✓	✓	✓
Communicate the log to relevant stakeholders	✓	✓		✓	✓		✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies, FB= Feedback from Fellow Members and RP= Role Play.

1. Written questions

#	Question	Answer
1	How does the sampling must be designed?	Sampling must be designed to obtain accurate data for identifying treatment process changes and varying water qualities. The objective is to remove a small portion that is representative of the entire flow and adequately reflects actual conditions in the water.
2	Where could be a suitable sample location?	The test requirements usually determine sample location. Obtain the sample where mixing is best and the water is of uniform quality. The sampling location must be accessible. Avoid slippery surfaces. Do not climb on or under guardrails.
3	What is composite samples?	This type of sample is taken to determine average conditions in a large volume of water whose chemical properties vary significantly over the course of a day. Small aliquots are taken at regular intervals and pooled into one large sample over a 24-h period.
4	What is grab sample?	A grab sample is taken all at once, at a specific time and place. Insert container upside down into the water. Rotate open end toward direction of flow and allow to fill under the surface.
5	What should be done if preservative or dechlorinating agent is added to empty sample bottle?	If preservative or dechlorinating agent has been added to empty sample bottle, adjust sampling technique so that the bottle does not overfill, or the chemical will be washed out.
6	Explain a shortly about sample bottle?	For chemical testing, the sample bottle must be clean. For bacteriological testing, the sample bottle must be clean and sterile. Bottles may be glass or plastic for most analyses; labels must be firmly attached to the sample bottle, not to the lid. Use labels that will not come off when damp. Use a water-insoluble ink pen. The label on a sample bottle should include sample ID number, date and time of collection, type of sample, location,

		adverse weather conditions, collector's initials, analysis to be performed, and sample preservation, if any.
7	What can be done while preservation and transport?	Dissolved oxygen, pH, and temperature should be analyzed on site, at the sampling location. Bacteriological tests must be performed within 24 h of sampling. All samples should be analyzed as soon as possible after collection.
8	What does the chain of custody records consist of?	• Sample labels — For sample identification • Sample seals — For shipped samples, to ensure no tampering • Field logbook — Includes all information on label, container type, sample size, field analysis, number of samples taken • Chain of custody record — Includes label information and change of possession forms
9	Process control and regulatory compliance depend upon the proper recording of laboratory analysis data. What does an analysis reports (bench sheets) consist of?	• Name, time, and date of analysis • Analyst name • Sample preparation • Analysis method • Test conditions (standards, reagents, instrument settings, temperature, and reaction time) • Results of analysis • Observations — comments
10	What should be dependable while selecting a sample size?	• Your resources for water quality testing and analyzing data • The total number of sampling points involved • The logistics in reaching the sampling points, especially those in rural, remote areas • How much data is needed to make a good decision • Your best judgment
11	Describe what ways can help you to decide which locations can be used for sample taking.	There are different methods to choose who or where you are going to sample. It is best to use a random sample (without a particular pattern) so that there is no bias in your results, but this might not always be possible.
12	What is a simple random sampling?	In this method, every household who took part in the project has an equal chance of being selected in the sample. You can use different methods to randomly select the households, such as drawing names or numbers from a hat, or using an online random number generator
13	What is systematic random sampling?	In this method, households are selected at particular intervals. The interval can be calculated by dividing the total number of households who took part in the project by the number of households to be selected (sample size).
14	What is cluster random sampling?	In this method, the population is divided into clusters or groups, and some of these are then chosen by simple random sampling. It is a good method to use for large projects. Samples taken from households of the same street or households within the same tribe are an example of cluster sampling.

15	What is convenience sampling?	Convenience sampling does not give you a random sample of the population because households are only selected if they can be accessed easily and conveniently. Many projects often use convenience sampling instead of random sampling due to limited time and resources.
16	Explain how to clean and sterilize sample containers.	You can reuse glass or heat resistant plastic sample containers. To prepare the containers, they should be washed with soap and rinsed at least three times (five is better) with distilled water to remove any residue. If distilled water is not available, clean chlorine-free water may be used (e.g., filtered and then boiled). After washing, sample containers for microbiological testing need to be sterilized. Sample containers for physical and chemical tests need to be clean, but not sterilized. However, often the same water sample is used for physical, chemical and microbiological testing, so then the container must be sterilized.
17	How can a container can be sterilized? State 4 methods.	1. Conventional oven: Heat at 180°C for 30 minutes 2. Boiling: Boil for 10 minutes 3. Autoclave: Heat at 121°C for 20 minutes 4. Pressure cooker: Heat for at least 30 minutes
18	While sampling on surface water. Where should you take the samples from?	For rivers or other moving water, you should try to obtain samples from a point where the water is well mixed and representative of the drinking water supply. Do not take samples that are too near the bank, too far from the point of where the drinking water is taken, or aa depth above/below the point of where the drinking water is taken. Surface water quality can also change depending on the time of day or season. It is important to sample at the same time of the day and record the weather conditions when you are taking your sample.
19	During dangerous cases of entering a water or taking sample by hand what technique can be used?	In these cases, you may need to tie your container to a piece of wire or rope and throw it into the water. A bridge is an excellent place at which to take a sample, but only if it is close to where people get their drinking water.
20	Explain the procedure of sampling a surface water source.	1. Carefully remove the cap from the container and put it facing up in a clean place or ask somebody to hold it. Take care to prevent dust from entering the container or anything else that may contaminate the sample. 2. Hold the sample container firmly and dip the open mouth of the container into the water. 3. Lower the container about 20 cm below the surface of the water and scoop up the water sample. This scooping action ensures that no external contamination enters the sample container. In areas where the water is moving (e.g., rivers), the sample should be taken against the direction of the flow of water. 4. Lift the sample container carefully and place on a clean surface where it cannot be knocked over. If the container is completely full, pour out a little water to leave an air space in the container. This allows space for mixing the water sample before analysis. Put the cap back on the container.

21	Explain the procedure of sampling an open well or tank.	1. Prepare the sample container. Use string, rope or cable to attach a weight (e.g., small rock) to the container. 2. Take a 20 m length of string, rolled around a stick, and tie it to the container. Open the container as described above. 3. Carefully remove the cap from the container and put it facing up in a clean place or ask somebody to hold it. Take care to prevent dust from entering the container or anything else that may contaminate the sample. 4. Lower the weighted sample container into the well or tank, unwinding the string slowly. Do not allow the container to touch the sides of the well or tank because it may pick up dirt and contaminate the sample. 5. Immerse the container completely in the water and continue to lower it below the surface of the water (about 20 cm although this can be difficult to judge). Do not allow the container to touch the bottom of the well or disturb any sediment. 6. Once the container is full, bring it up by rewinding the string around the stick. Lift the container carefully and place on a clean surface where it cannot be knocked over. If the container is completely full, pour out a little water to leave an air space in the container. This allows space for mixing the water sample before analysis. Put the cap back on the container.
22	Explain the procedure of sampling a tap?	1. Remove any attachments (e.g., nozzles, pipes, screens) from the tap. These attachments are a frequent source of contamination. 2. Optional - Use a clean cloth to wipe the tap and to remove any dirt. Sterilize the inside and outside of the tap for 1 minute. Pour alcohol on the outlet and flame it with a lighter or use tweezers to hold an alcohol-soaked cotton swab that is lit on fire. If the tap is made of plastic, then use an alcohol-soaked cotton swab that is NOT lit on fire, or else the plastic will melt! Sterilizing the tap will tell you the actual water quality. Not sterilizing the tap will tell you the water quality that people are drinking. 3. Open the tap before sampling. Carefully turn on the tap and allow water to flow at a moderate rate for 2-3 minutes to clear out any deposits in the pipes. 4. Carefully remove the cap from the container and put it facing up in a clean place or ask somebody to hold it. Take care to prevent dust from entering the container or anything else that may contaminate the sample. Hold the sample container under the water flow to fill it. Leave an air space in the container. This allows space for mixing the water sample before analysis. Put the cap back on the container.
23	What is colorimetric method?	Chemical reagents are added to the water sample which react with the particular chemical parameter of interest. The product that is formed absorbs light at a particular wavelength. The

		water sample is then analyzed in a colorimeter or spectrophotometer and compared to known standards.
24	What is electrode method?	Ion-selective electrodes can measure the concentration of certain ions in the water sample. pH is easily measured with an electrode and meter.
25	What is Atomic Absorption Spectrometer (AAS)?	AAS is used to analyze the presence of metals. Samples are heated either in a flame or electrically in a graphite furnace, and the concentration is determined by the metal atom's absorption of light at a particular wavelength.
26	What is Inductively Coupled Plasma (ICP)?	ICP is also used to analyze the presence of metals. Samples are broken down to the atomic level and metals are detected either through atomic emission spectroscopy or mass spectroscopy.
27	State a limitation of test strips?	The main limitation of test strips is that they are less accurate since they require a visual interpretation of the results.
28	It is important to use the required activation method for the test strip you are using. Different products that require different activation methods. Mention different types of activation methods.	• Dipping the strip in the sample • Swishing the strip back and forth in the sample • Holding the reagent area in a stream of the sample
29	Different test strips require different times that you must wait before you compare the strip to the colour chart. What happens when you use a wrong activation method?	Using the wrong activation method or reading your results too early or late for that test strip may lead to incorrect results.
30	Colour discs are available for a range of chemical parameters. Mention those chemical parameters.	Chlorine, fluoride, nitrate, iron and manganese
31	What is a colorimeter and photometer	Colorimeters and photometers are digital instruments that use a light source to measure the chemical concentration in a water sample. Compared to test strips, they offer more accurate and repeatable results since the concentration is given as a digital reading.
32	State an advantage and disadvantage of colorimeter and photometer.	Colorimeters and photometers can read a large variety of chemicals in a water sample, as well as a wider numerical range within each parameter. However, they are more expensive, need a power source and require training to ensure they are being used properly.
33	What is a digital meter?	Some portable test kits include various digital meters to measure parameters like pH and electrical conductivity (EC).
34	State an advantage and disadvantage of digital meters.	They are relatively easy to use and can provide more accurate measurements than other methods, such as test strips. The main disadvantages are the need to calibrate the meters and

		replace batteries as required, and the general fragility of electronic equipment.
35	What is a buffer solution?	The buffer solution is really a "buffer." It neutralizes any possible acid or alkaline influences present in the water in which it is dissolved, and the pH should reside very stably at its designated value.
36	What are some factors that should be taken into consideration when choosing an appropriate microbiological test method?	• Available resources • Required level of accuracy and precision • Technical skills of staff • Geographical location • Objective of the results
37	What are the three main test methods to determine the presence of indicator bacteria in drinking water?	• Presence/absence (P-A) • Most probable number (MPN) • Membrane filtration
38	What is Presence-Absence?	Presence-absence (P-A) is a qualitative test that depends on a colour change to indicate the presence of contamination. If the test turns out to be positive, meaning that the indicator bacteria is present, the water sample will change to a specific colour. P-A tests will not tell you the quantity of indicator bacteria in the water sample.
39	What is different P-A products that can test for three types of indicator bacteria?	1. H_2S producing bacteria 2. Total coliform bacteria 3. Total coliform bacteria and *E. coli*
40	There are also different P-A tests that use total coliform and/or *E. coli* as the indicators. What is a general process for these tests?	1. A powdered reagent is added to the water sample 2. The sample is incubated for 24-48 hours at 35oC 3. The results are read: Colourless = negative, Colour = total coliforms present, Fluorescent = *E. coli* present (seen using a UV lamp)
41	What is a filter paper?	Filter paper, also called a membrane filter, is used to trap the bacteria from the water sample. A pore size of 0.45 µm is most commonly used since it filters out all coliform bacteria. The filter paper usually has a grid printed on it so that you can more easily count the bacteria colonies. There are various types of filter papers with different grid colours available from manufacturers.
42	What is a culture media?	Culture media are substances which contain nutrients to help the bacteria grow. Culture media in liquid form is called a broth and the semi-solid form (gel) is called an agar. Different culture media are used to grow different indicator bacteria.
43	Describe what is an incubator	The incubator is another important piece of equipment needed for membrane filtration, and sometimes for P-A and MPN tests. There are different types of incubators made by different manufacturers. Some incubators are portable and use a battery

		for power supply, while others need to stay in one location and use the main power supply.
44	What is the purpose of incubation temperature with an example?	The incubation temperature is critical to ensure that microbiological test results are accurate. Different culture media require different temperatures to grow the specific indicator bacteria. For example, thermotolerant coliforms grow at 44oC.
45	What are the following preparation to look over before selecting sites?	• Understand the purpose for which the various types of data will be collected and the aqueous system that each sample should represent. • Review the study workplan, especially types of measurements and samples needed. • Make field reconnaissance trips before selecting sampling sites, if possible. o Note conditions that could affect sampling operations (such as the seasonal high or low streamflow, flowing wells, or siteaccess peculiarities). o Evaluate potential sources of contamination at the site, based on target analytes1 to be collected. • Review site files and field folders. (Note site location, description and access, and review any previously collected physical, chemical, and biological data.) • X Obtain and keep current with training and the laboratory requirements associated with your data-collection activities.
46	What is the purpose of updating documentation?	A log sheet or register should be used to record the results of every test performed. The keeping of complete and accurate records is a professional activity and can be used to demonstrate competency in operations.

2. PT=Practical Test

#	Questions	Answers
1	Student Assignments	Students need to undertake assignments related to collect samples at field or production sites using specified equipment and standard or routine procedures, as they continue with the unit. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Prepare for sampling ✓ Collect sampling ✓ Perform basic water test ✓ Update documentation

3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Prepare for sampling ✓ Collect sampling ✓ Perform basic water test ✓ Update documentation
4	Demonstrate the procedure of sampling a surface water source.	The student is expected to follow the correct step-by step process to take sampling from a surface water source. The elements which should be assessed are: 1. Carefully remove the cap from the container and put it facing up in a clean place or ask somebody to hold it. Take care to prevent dust from entering the container or anything else that may contaminate the sample. 2. Hold the sample container firmly and dip the open mouth of the container into the water. 3. Lower the container about 20 cm below the surface of the water and scoop up the water sample. This scooping action ensures that no external contamination enters the sample container. In areas where the water is moving (e.g., rivers), the sample should be taken against the direction of the flow of water. ✓ Lift the sample container carefully and place on a clean surface where it cannot be knocked over. If the container is completely full, pour out a little water to leave an air space in the container. This allows space for mixing the water sample before analysis. Put the cap back on the container.

3. OW =Observation at work Place

#	Questions	Answers
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Prepare for sampling ✓ Collect sampling ✓ Perform basic water test ✓ Update documentation
2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities related to the above areas or elements covered within the competency unit.

3	Student Assignments	During the implementation of the training program, students would have completed assignments related to collect samples at field or production sites using specified equipment and standard or routine procedures. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Demonstrate how to clean and sterilize sample containers.	As the students attend the practical test to demonstrate cleaning and sterilization of sample containers, make sure the student uses the proper techniques and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Answers
1	Prepare for sampling	Make sure the students answer questions related to the following areas ✓ Confirm the purpose, priority and scope of the sampling request ✓ Liaise with relevant personnel to arrange site access and all necessary clearances/permits ✓ Identify site hazards and review workplace safety procedures ✓ Confirm what samples are to be collected, from where, how and when ✓ Assemble all specified sampling equipment, safety equipment, materials and containers ✓ Conduct pre-use and cleanliness checks of all items to ensure they are fit for purpose ✓ Check all items against given inventory and stow them to ensure safe transport
2	Collect sampling	Make sure the students answer questions related to the following areas ✓ Locate sampling points and services at the site ✓ Remove security devices, such as locks and covers as required ✓ Seek advice if the required samples cannot be collected or if procedures require modification ✓ Select and use required sampling equipment in accordance with given procedures ✓ Closely follow sampling procedures to obtain required samples and maintain their integrity ✓ Record all labelling information in accordance with workplace/legal traceability requirements

		✓ Record sample appearance, environmental conditions and any other factors that may impact on sample integrity ✓ Replace security devices, such as locks and covers as required
3	Perform basic water test	Make sure the students answer questions related to the following areas ✓ Identify daily water tests to be performed aligned to EPA standard. ✓ Perform basis water tests
4	Update documentation	Make sure the students answer questions related to the following areas ✓ Record log of the tests performed including their results. ✓ Communicate the log to relevant stakeholders.

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-15: Monitor and Operate power generation system

Unit No	15
Unit Title	Monitor and Operate power generation system
Unit Code	**CONS02CR08V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Confirm operational status							
Check production requirements at start of shift and plan daily work activities in line with organisational safety and standard operating procedures.		✓	✓		✓	✓	✓
Confirm power generation processes are within operational specifications by observation and inspection.	✓	✓		✓	✓		✓
Maintain process supplies to meet production requirements.	✓	✓	✓		✓	✓	
Communicate operational status to relevant personnel		✓	✓		✓	✓	✓
2. Monitor and control power generation plant operation							
Confirm operational status by inspection and routine observation.		✓	✓		✓	✓	✓
Monitor and maintain continuing process supplies to meet production requirements.	✓	✓		✓	✓		✓
Monitor and maintain power output demand and distribution system to meet production requirements.	✓	✓	✓		✓	✓	
Handling materials and substances		✓	✓		✓	✓	✓
3. Record and report power generation performance							
Record pressures, temperatures and flows.		✓	✓		✓	✓	✓
Record power generation processes and data in operating log.	✓	✓		✓	✓		✓
Record and report maintenance requirements	✓	✓	✓		✓	✓	

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play.

1. Written questions

#	Question	Answer
1	How is water treatment plant operated?	Water treatment plants are operated using electrical power and the referred power is often produced through the power plants that are often established together with the water treatment plants.
2	Describe how should your work schedule needs to be followed.	First and foremost, your work schedule needs to ensure that each shift is staffed appropriately for each position and it is important that each staff is made aware of the various shifts tasks that need to be maintained while the powerplants need to be operated round the day for uninterpreted power the water treatment plants.
3	What is a diesel generator?	A diesel generator is the combination of a diesel engine with an electric generator (often an alternator) to generate electrical energy.
4	How is diesel compression-ignition engine designed for?	A diesel compression-ignition engine often is designed to run on fuel oil, but some types are adapted for other liquid fuels or natural gas.
5	Explain a simple general routine inspection of a diesel generator.	During the running of the diesel generator, the exhaust system, fuel system, DC electrical system and engine require close monitoring for any leaks that can cause hazardous occurrences. As with any internal combustion engine, proper maintenance is essential.
6	Explain lubrication service of a diesel generator.	The engine oil must be checked while shutting down the generator at regular intervals using a dipstick. Allow the oil in the upper portions of the engine to drain back into the crankcase and follow the engine manufacturer's recommendations for API oil classification and oil viscosity.
7	Explain cooling system of a diesel generator.	Check the coolant level during shutdown periods at the specified interval. Remove the radiator cap after allowing the engine to cool, and, if necessary, add coolant until the level is about 3/4 in. Heavy-duty diesel engines require a balanced coolant mixture of water, antifreeze, and coolant additives.
8	Explain how a routine engine exercise is taken.	Regular exercising keeps the engine parts lubricated and thwart oxidation of electrical contacts, uses up fuel before it deteriorates, and helps to provide reliable engine starting. Engine exercise is recommended to be executed at least once a month for a minimum of 30 min. loaded to no less than one-third of the nameplate rating.
9	What are the essential components of a diesel electric power plant?	1. Diesel Engine 2. Engine Fuel Supply System 3. Engine Air Intake System 4. Engine Exhaust System 5. Engine Cooling System 6. Engine Lubrication System. 7. Engine Starting System.
10	What is the main component of a diesel electric power plant? Explain why?	Diesel engine: It is the main components used in diesel electric power plant for developing mechanical power.

		This mechanical power we use to run the generator & produce electrical energy. For producing the electrical energy, the diesel engine is mechanically coupled to generator.
11	What does the engine fuel supply system consist of?	It consists of Fuel Storage Tank, Fuel Filter or Strainer, Fuel Transfer Pump, Day Tank, Heaters & Connecting Pipes.
12	What does the engine Air-Intake system consist of?	This System includes air filters, air tank, compressor & connecting pipes.
13	Explain the process of engine air-intake system.	The air filters are used to supply the fresh air to diesel engine for the purpose of combustion. Engine required fresh air because, if dust particles in the air entered into the engine will cause disastrous effect to valve, cylinder & pistons. The compressor or Supercharger is used to increase pressure of the air supplied to the engine.
14	What does the engine exhaust system consist of?	These systems consist of silencers & connecting ducts.
15	What does the engine cooling system consist of?	The Diesel Engine Cooling System Consist of coolant pumps, water cooling towers or spray pond, water treatment or filtration plant & Connecting Pipe Works.
16	How are the cooling tower reuses the same water?	The cooling system requires a water source, water pump and cooling towers. The pump circulates water through cylinder and head jacket. The water takes away heat from the engine and it becomes hot. The hot water is cooled by cooling towers and is re-circulated for cooling.
17	What are the two types of cooling system that is classified to?	Open Cooling System*:* A Plant near the river may utilize the river water for cooling & discharging again the hot water into river. This type of cooling system is known as open cooling system. Closed Cooling System*:* The Cooling Water is circulated again & again and only water lost due to leakage, evaporation etc. is made up by taking make up water from supply source.
18	Explain the engine starting system.	The function of starting system is to start the engine form stand still or cold conditions by supplying compressed air. For starting a diesel engine, initial rotation of the engine shaft is required. Until the firing start and the unit runs with its own power. For small DG sets, the initial rotation of the shaft is provided by battery operated starting motors.
19	What is reporting?	Reporting is the process of communicating an identified issue by notifying the relevant information to the supervisory level and to the appropriate internal and external organizations.
20	What are the factors that a generator maintenance that requires?	• Annual fuel cleaning and filtering, as diesel fuel degrades quickly. After a few weeks of operation, diesel fuel degrades via contamination of water and microbes, resulting in clogged fuel lines and filters. Fuel cleaning involves using biocides annually in all generators except for the standby generator, in which it will attract moisture. • The cooling system to be maintained, which requires checking the coolant level at existing intervals. This must be done during shutdown periods.

		• Checking for battery power; this is especially true for standby generators, as battery issues are their primary cause of failure. Make sure the batteries are robust and charged enough to last long so as to not incur any start-up hitches for the generator. • Regular testing to inform of the battery's current status. Testing involves checking the electrolyte levels and specific gravity of the batteries. The batteries themselves also must be clean.
21	What are the components & systems that must be given importance to its safety while establishing an in-service inspection programme?	a) Pressure retaining parts of components in the reactor coolant system; b) Components of or connected to the primary reactor coolant system that are essential for ensuring the shutdown of the reactor and cooling of the nuclear fuel in relevant operational states and in postulated accident conditions; c) Other components, such as main steam lines or feedwater lines, whose dislodgement or failure might put in jeopardy the systems mentioned in items (1) and (2) above. d) When new inspection methods are introduced, a comparison with the previous methods should be made. Such a comparison will provide a revised baseline for future inspections.
22	Explain briefly about maintenance requirement for oil circuit breaker?	Every circuit-breaker should be thoroughly inspected at regular intervals of three or six months, depending upon usage, during which all the points referred to under above should be checked. In addition, check the level and condition of oil. Clean the insulators examine the arcing contacts and attended if necessary, check auxiliary contacts for cleanliness and contact making. Finally, check all bolts and nuts for tightness, particularly those securing heavy current carrying parts, check operating mechanism, adding a few drops of oil where required.
23	What are the points to check during periodical maintenance?	1. Check all current carrying parts and attend to the arcing contacts 2. Examine the oil and change it if it is badly discolored, test breakdown voltage if in doubt. Good oil should withstand 30KV for one minute, in a standard oil testing cup with 0.15 inch gap between electrodes. Renew oil if bad, after removing all sludge. 3. Inspect the insulation for possible damage. Clean the surface and remove deposits of carbon. In cleaning circuit-breakers never use loose cotton waste, but only strong, firm and dry fabric, which will not deposit loose fibers. 4. Check closing, tripping and interlock mechanisms. 5. Ensure, before closing the tank that no tools have been left behind, that the tank lining and barriers are in position and secure, and that the tank gasket is in good condition.
24	What does a written record of a generator inspections must be include off?	This record must, at a minimum, include: the date of the report, name(s) of the person(s) providing the service, identification of unsatisfactory conditions and corrective action taken (including parts replaced), and any testing of repairs recommended by the manufacturer.

25	What is the importance of documentation of a generator?	It is important to properly document performance of the generators as the referred documentations will assist in monitoring and maintaining power output demand and distribution system to meet production requirements.
26	How can you record pressures, temperatures and flows?	Performance of diesel engine used within the diesel generators, will include pressure and temperature points, together with difference in flow that impact performance of the engine. These points need to be constantly monitored and recorded as they impact performance of the diesel generators.
27	How to record power generation processes and data in operating log?	Monitoring and observations are vital to entry into a log and it is vital that the operators in power houses using diesel engines, need to perform eh following tasks and record the parameters into a log sheet.
28	Explain about lubrication oil temperature. Write 100-120 words.	As with the jacket cooling water, excessive temperature of the lubricating oil will lead to engine damage and failure. The lubrication system not only provides lubrication for the engine components, it also serves a cooling function by removing excess heat from various points in the engine not cooled by the jacket water system. In addition, chemical failure, or break-down, of the lubricating oil will occur if it is not adequately cooled. This leads to reduced oil viscosity. Reduced oil viscosity will ultimately result in metal-to-metal contact, friction, excessive wear, component damage, and possible engine failure. Temperature sensors are normally located in the lubrication oil sump or in the exit piping from the sump and it is vital to continuously monitor and record changes.
29	What kind of reasons are there for a diesel generator to produce alarms?	• Fuel Oil Level-Day Tank-Low • Starting Air Pressure-Low • Start Failure • Intercooler Water Temperature-High • Jacket Water Keep Warm Temp-Low • Jacket Water Pressure-Low • Jacket Water Level-Low • Lube Oil Keep Warm Temp-Low • Lube Oil Strainer Differential-High • Lube Oil Filter Differential-High • Lube Oil Level-Crankcase/Sump-Low • Rocker Arm LO Pressure-Low • Rocker Arm LO Lever-Abnormal • Engine Vibration-High • Loss of Control Power • Switch not in Auto • Engine Lockout Tripped (86DG) • Engine Ready to Load
30	Explain about record and reporting of maintenance requirements?	The implementation of an effective data collection and record keeping system at a power plant is a major task which requires significant resources. However, the attendant benefits and the decreasing cost and increasing capability of computation are expected to make the proposed improvements feasible and

		economic. The general data needs and the attributes of a data collection and record keeping system for the management of ageing degradation and the service life of components.

2. PT=Practical Test

#	Questions	Answers
1	Student Assignments	Students need to undertake assignments related to operate, monitor and maintain power generation systems and record and report operating data. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Confirm operational status ✓ Monitor and control power generation plant operation ✓ Record and report power generation performance
3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Confirm operational status ✓ Monitor and control power generation plant operation ✓ Record and report power generation performance
4	Demonstrate how lubrication service of a diesel generator is taken.	The student is expected to follow the correct step-by step process on how lubrication service is taken. The elements which should be assessed are: ✓ The engine oil must be checked while shutting down the generator at regular intervals using a dipstick. ✓ Allow the oil in the upper portions of the engine to drain back into the crankcase ✓ Follow the engine manufacturer's recommendations for API oil classification and oil viscosity.

3. OW =Observation at work Place

#	Questions	Answers
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Confirm operational status ✓ Monitor and control power generation plant operation ✓ Record and report power generation performance
2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities

		related to the above areas or elements covered within the competency unit.
3	Student Assignments	During the implementation of the training program, students would have completed assignments related to operate, monitor and maintain power generation systems and record and report operating data. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Conduct general routine inspection of a diesel generator.	As the students attend the practical test to assess and conduct a general inspection of diesel generator, make sure the student use the proper techniques and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Answers
1	Confirm operational status	Make sure the students answer questions related to the following areas ✓ Check production requirements at start of shift and plan daily work activities in line with organisational safety and standard operating procedures. ✓ Confirm power generation processes are within operational specifications by observation and inspection. ✓ Maintain process supplies to meet production requirements. ✓ Communicate operational status to relevant personnel.
2	Monitor and control power generation plant operation	Make sure the students answer questions related to the following areas ✓ Confirm operational status by inspection and routine observation. ✓ Monitor and maintain continuing process supplies to meet production requirements. ✓ Monitor and maintain power output demand and distribution system to meet production requirements. ✓ Handling materials and substances
3	Record and report power generation performance	Make sure the students answer questions related to the following areas ✓ Record pressures, temperatures and flows. ✓ Record power generation processes and data in operating log. ✓ Record and report maintenance requirements.

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	**TRB/LB =Trainee's Record/Log Book**	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	**TR=Trainer Report**	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	**Other Sources**	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.

Unit-16: Trouble shooting of control systems

Unit No	16
Unit Title	Trouble shooting of control systems
Unit Code	**CONS02CR09V1/21**

Evidence Matrix

Elements of Competence and Performance Criteria	WT = written Test	PT=Practical Test	OW =Observation at work Place	OQ= Oral questioning	TRB/LB= Trainee's Record / Log Book	TR= trainer report	Other Sources *
1. Prepare to find and rectify faults							
OHS procedures for a given work area are identified, obtained and understood		✓	✓		✓	✓	✓
OHS risk control measures and procedures are followed in preparation for the work.	✓	✓		✓	✓		✓
The nature of the fault is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.	✓	✓	✓		✓	✓	
Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.		✓	✓		✓	✓	✓
Sources of materials that may be required for the work are established in accordance with established procedures.	✓	✓		✓	✓		✓
Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety	✓	✓	✓		✓	✓	
2. Find faults							
OHS risk control measures and procedures for carrying out the work are followed.		✓	✓		✓	✓	✓
The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures	✓	✓		✓	✓		✓
Apparatus is checked as being isolated where necessary in strict accordance OHS requirements and procedures	✓	✓	✓		✓	✓	
Fault finding is approached methodically drawing on knowledge of industrial processes and control apparatus and systems using measured and calculated values of system parameters.		✓	✓		✓	✓	✓
Apparatus components are dismantled where necessary and parts stored to protect them against loss or damage	✓	✓		✓	✓		✓

Faulty components are rechecked and their fault status confirmed.		✓	✓		✓	✓	✓
Unexpected situations are dealt with safely and with the approval of an authorised person.	✓	✓		✓	✓		✓
Fault finding activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.	✓	✓	✓		✓	✓	
3. Rectify fault							
OHS risk control measures and procedures for carrying out the work are followed.		✓	✓		✓	✓	✓
Apparatus is checked as being isolated where necessary in strict accordance OHS requirements and procedures	✓	✓		✓	✓		✓
Materials required to rectify faults are sourced and obtained in accordance with established procedures.	✓	✓	✓		✓	✓	
Repairs are affected efficiently without damage to other components or apparatus and using sustainable energy principles.		✓	✓		✓	✓	✓
Effectiveness of the repair is tested in accordance with established procedures.	✓	✓		✓	✓		✓
Apparatus is reassembled, finally tested and prepared for return to customer	✓	✓	✓		✓	✓	
4. Completion and report fault finding and rectification activities							
OHS work completion risk control measures and procedures are followed.		✓	✓		✓	✓	✓
Work area is cleaned and made safe in accordance with established procedures.	✓	✓		✓	✓		✓
Written justification is made for repairs to apparatus.	✓	✓	✓		✓	✓	
Work completion is documented and appropriate person(s) notified in accordance with established procedures		✓	✓		✓	✓	✓

Note:

- ✓ "Other Sources" meant that Assessor can choose evidence from other sources such as S=supervisor/team leader report, C = CertificatesT=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play.

1. Written questions

#	Question	Answer
1	What are the steps that involves the job safety analysis?	1. Select the job. 2. Break down the job into a sequence of steps. 3. Identify the hazards. 4. Define preventive measures.
2	The analysis should be conducted on all critical tasks or jobs as a first priority. What	Those where frequent accidents and injuries occur. Those where severe accidents and injuries occur. Those with a potential for severe injuries. New or modified jobs. Infrequently performed jobs, such as maintenance.

	are the critical jobs of a task?	
3	How is job safety analysis carried out?	Job safety analysis is generally carried out by observing a worker doing the job. Members of the joint health and safety committee should participate in this process. The reason for the exercise must be clearly explained to the worker, emphasizing that the job, not the individual, is being studied. Another approach, useful in the analysis of infrequently-performed or new jobs, is group discussion.
4	What are workplace inspections?	Workplace inspections help to identify existing hazards so that appropriate corrective action can be taken. Health and safety legislation requires workplace inspections as a proactive action to ensure workplace health and safety.
5	What is pre-planning inspection?	Pre-planning any inspection is always worthwhile. Documents, such as previous inspections, accident investigations, maintenance reports, and committee minutes, should be consulted. If a checklist is to be used, it should be reviewed and changed to meet specific needs of the workplace. Checklists are useful aids in that they help ensure that no items are overlooked in an inspection. One type of checklist is the "critical parts inventory".
6	Define risk according to OHS terms?	When we refer to risk in relation to occupational safety and health the most commonly used definition is 'risk is the likelihood that a person may be harmed or suffers adverse health effects if exposed to a hazard.'
7	How do you categorize risk levels?	The level of risk is often categorised upon the potential harm or adverse health effect that the hazard may cause, the number of times persons are exposed and the number of persons exposed. For example exposure to airborne asbestos fibres will always be classified as high because a single exposure may cause potentially fatal lung disease, whereas the risk associated with using a display screen for a short period could be considered to be very low as the potential harm or adverse health effects are minimal.
8	What are control measures?	Control measures include actions that can be taken to reduce the potential of exposure to the hazard, or the control measure could be to remove the hazard or to reduce the likelihood of the risk of the exposure to that hazard being realised. A simple control measure would be the secure guarding of moving parts of machinery eliminating the potential for contact.
9	Mention the four steps for managing WHS risks?	*Step 1 - Identify hazards* Find out what could cause harm. *Step 2 - Assess risks* If necessary – understand the nature of the harm that could be caused by the hazard, how serious the harm could be and the likelihood of it happening. This step may not be necessary if you are dealing with a known risk, with known controls.

		Step 3 - Control risks Implement the most effective control measure that is reasonably practicable in the circumstances and ensure that it remains effective over time. *Step 4 - Review control measures* Review the control measures to ensure they are working as planned.
10	How can you establish a good structure while working?	Creating an effective workflow starts by establishing a clear chain of command. Clearly defining job roles and associated responsibilities ensures that everyone knows what to do. Establishing an organizational chart lets everyone know who to contact when things go wrong. This can be distributed by email, newsletter or company website. Each department should produce regular status reports and communicate with other departments to ensure work flows from one part of the organization to another.
11	How can you plan tasks?	Project coordinators usually develop comprehensive plans to describe the work involved with producing a company's products and services. They use the techniques recommended by professional organizations, such as the Project Management Institute. For example, these coordinators use standard templates to complete a stakeholder analysis, develop a project charter, create a work breakdown structure, assign resources and monitor task completion.
12	How can you do a better communication and decision making?	Good communication prevents disputes, conflicts and delays. Project coordinators can foster effective communication by conducting regular team meetings, distributing status reports and documenting decisions made.
13	What is effective leadership?	Effective leadership often involves influencing and motivating team members to adhere to established policies and procedures so operations run smoothly. Coordinating the efforts of many different employees, particularly when they are not located in the same place or time zone, typically requires arranging regular meetings to exchange information and using written communication to document procedures.
14	What is an expert troubleshooter?	An expert troubleshooter uses a system or approach that allows them to logically and systematically analyze a circuit and determine exactly what is wrong.
15	What are the five principles or steps of troubleshooting approach?	✓ Preparation ✓ Step 1 Observation ✓ Step 2 Define Problem Area ✓ Step 3 Identify Possible Causes ✓ Step 4 Determine Most Probable Cause ✓ Step 5 Test and Repair ✓ Follow-up
16	Explain the step of preparation in troubleshooting.	Before you begin to troubleshoot any piece of equipment, you must be familiar with your organization's safety rules and procedures for working on electrical equipment. These rules and procedures govern the methods you can use to troubleshoot electrical equipment (including your lockout/tagout procedures, testing procedures etc.) and must be followed while troubleshooting.

		Next, you need to gather information regarding the equipment and the problem. Be sure you understand how the equipment is designed to operate. It is much easier to analyze faulty operation when you know how it should operate.
17	Explain the first to third steps of troubleshooting approach.	**Step 1 - Observe** Most faults provide obvious clues as to their cause. Through careful observation and a little bit of reasoning, most faults can be identified as to the actual component with very little testing. When observing malfunctioning equipment, look for visual signs of mechanical damage such as indications of impact, chafed wires, loose components or parts laying in the bottom of the cabinet. Look for signs of overheating, especially on wiring, relay coils, and printed circuit boards. **Step 2 - Define Problem Area** It is at this stage that you apply logic and reasoning to your observations to determine the problem area of the malfunctioning equipment. Often times when equipment malfunctions, certain parts of the equipment will work properly while others not. **Step 3 - Identify Possible Causes** Once the problem area(s) have been defined, it is necessary to identify all the possible causes of the malfunction. This typically involves every component in the problem area(s). It is necessary to list (actually write down) every fault which could cause the problem no matter how remote the possibility of it occurring. Use your initial observations to help you do this. During the next step you will eliminate those which are not likely to happen.
18	While facing with equipment which are not function what should be properly checked?	• Be sure you understand how the equipment is designed to operate. It makes it much easier to analyze faulty operation when you know how it should operate; • Note the condition of the equipment as found. You should look at the state of the relays (energized or not), which lamps are lit, which auxiliary equipment is energized or running etc. This is the best time to give the equipment a thorough inspection (using all your senses). Look for signs of mechanical damage, overheating, unusual sounds, smells etc.; • Test the operation of the equipment including all of its features. Make note of any feature that is not operating properly. Make sure you observe these operations very carefully. This can give you a lot of valuable information regarding all parts of the equipment.
19	Explain about maintenance management.	Maintenance management is concerned with the direction and organization of resources in order to control the availability and performance of plant to some specified level.

		The maintenance management is therefore a restorative function to ensure availability and efficiency of the existing plant, equipment and buildings at an optimum level.
20	Plant and equipment maintenance plays an important role in production management be-cause breakdown creates problems. What are those kinds of problems?	• Loss of productive time • Re-scheduling of production • Need for sub-contracting work • Temporary work shortage, as during break down workers may not have work for them.
21	What are the two types of ways that maintenance can be done?	1. Breakdown maintenance. 2. Preventive maintenance.
22	Explain Break down maintenance.	Breakdown maintenance is defined as a maintenance activity conducted on a machine which has ceased functioning owing to shear or crushing or buckling or elongation or swelling or any other form of failure of any critical component of the said machine in order to enable the same to function as before by resorting to necessary replacement(s) of the same and/ or more number of components by new ones or usable old ones and/ or re-conditioning of the same within the minimum time period considering scope of work, available facilities and skill.
23	How can a breakdown of machine occur?	• Due to unpredictable failure of components which cannot be prevented. • Due to gradual wear and tear of the parts, which can be eliminated to a large extent by regular inspections, known as preventive maintenance. From experience it can be decided that, when a part should be replaced, so that breakdown can be avoided.
24	Explain preventive maintenance.	Preventive Maintenance is defined as a maintenance activity conducted on a machine as per laid down schedule or frequency by making necessary or need-based replacement and/or reconditioning of component(s) within the pre-fixed time period of the said work in order to reduce and avert breakdown(s). Preventive maintenance is sometimes termed as “planned maintenance” or “scheduled maintenance” or “systematic plant maintenance” etc. It is an extremely important function for the reduction of maintenance cost and to keep the good operational condition of equipment and hence increases the reliability.
25	What are the main objectives of preventive maintenance?	• To obtain maximum availability of the plant by avoiding breakdown and by reducing the shutdown periods to a minimum. • To keep the machine in proper condition so as to maintain the quality of the product.

		• By minimising the wear and tear, preserve the value of the plant. • To ensure for the safety of the workers. • To keep the plant at the maximum production efficiency. • To achieve all the above objectives with most economical combination.
26	What is checked during and equipment inspection?	Heavy equipment inspections combine data collection and analysis with hands-on testing and examination for a thorough look at the equipment's condition. A complete inspection is an important preventive way to make sure equipment is safe for use and that all systems are working properly.
27	Inspections should be carried out daily and what are the areas to look during inspection?	• Brakes and lights • Tire pressure • Fluid levels • Mirrors and glass • Seatbelts • Horn • Emergency stopping system • Safety devices • Steering • Tire condition • Fuel and oil leaks
28	When should you get the equipment professional inspected?	• It has been exposed to conditions that could cause damage and lead to harm • Suspected damage has occurred • It has experienced severe environmental conditions, such as when it is dusty, wet, muddy or has been in corrosive coastal environments • It has been driven on unpaved roads or mountainous terrain • It has had several operators • There is any sign of needed repair shown through signals, noises or obvious damage • You are about to do a tough job • Your worksite is located far away from your shop • You are about to buy a piece of used equipment or sell your equipment
29	What are the reasons for machinery failures?	**Thermally induced failure:** Equipment overheats, or extreme temps cause equipment to break down. **Mechanically induced failure:** It is easy to prevent this with inspection and replacing parts. Mechanically induced failure often happens due to overexertion, collision and misuse or abuse. **Erratic failure:** Occurs randomly due to harder-to-detect reasons, such as electrical issues or software malfunction.

		Erratic failure can be prevented with the help of diagnostic equipment used during inspection.
30	What are the benefits of equipment inspections?	Inspection is an opportunity to save money, prevent injury and stand out from competitors. Your productivity is only as good as your equipment is, and you can't get very far with broken equipment or out-of-work employees. Regular inspections take productivity and safety to the next level, beyond mandatory inspections.

2. PT=Practical Test

#	Questions	Answers
1	Student Assignments	Students need to undertake assignments related to finding and rectifying faults in process control apparatus and systems, as they continue with the unit. Referred assignment will be covering practical aspects related to the unit.
2	Review Log Book for practical activities	Review log books and examine participation of the students in relevant workplace activities and in particular of the following areas. ✓ Prepare to find and rectify faults ✓ Find faults ✓ Rectify fault ✓ Completion and report fault finding and rectification activities
3	Review Assessment papers	Review unit and final assessment papers completed by the students and crosscheck their practical skills related to the following. ✓ Prepare to find and rectify faults ✓ Find faults ✓ Rectify fault ✓ Completion and report fault finding and rectification activities
4	Demonstrate the five principles or steps of troubleshooting approach?	The student is expected to follow the correct step-by step process of troubleshooting. The elements which should be assessed are: ✓ Preparation ✓ Step 1: Observation ✓ Step 2: Define Problem Area ✓ Step 3: Identify Possible Causes ✓ Step 4: Determine Most Probable Cause ✓ Step 5: Test and Repair ✓ Follow-up

3. OW =Observation at work Place

#	Questions	Answers
1	Assessment papers	While reviewing the papers, make an assessment of the student knowledge and skills related to the various elements stipulated within the competency unit. Please make sure the observations and findings are compared to the theoretical knowledge and practical skills included within the following areas prior to making a judgment on the performance of the students. ✓ Prepare to find and rectify faults ✓ Find faults ✓ Rectify fault ✓ Completion and report fault finding and rectification activities
2	Log Books	Likewise, make sure log books are reviewed to assess and evaluate extent of student participation on practical activities related to the above areas or elements covered within the competency unit.
3	Student Assignments	During the implementation of the training program, students would have completed assignments related to finding and rectifying faults in process control apparatus and systems. Review the assignment reports carefully to ensure students' performance related to the elements of competencies are evaluated and judged.
4	Demonstrate what to checked during and equipment inspection	As the students attend the practical test to make sure equipment is safe for use and that all systems are working properly., make sure the student uses the proper techniques and the information he shared is accurate.

4. OQ=Oral Questioning

#	Questions	Answers
1	Prepare to find and rectify faults	Make sure the students answer questions related to the following areas ✓ OHS procedures for a given work area are identified, obtained and understood ✓ OHS risk control measures and procedures are followed in preparation for the work. ✓ The nature of the fault is obtained from documentation or from work supervisor to establish the scope of work to be undertaken. ✓ Advice is sought from the work supervisor to ensure the work is coordinated effectively with others. ✓ Sources of materials that may be required for the work are established in accordance with established procedures. ✓ Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct

		✓ operation and safety
2	Find faults	Make sure the students answer questions related to the following areas ✓ OHS risk control measures and procedures for carrying out the work are followed. ✓ The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures ✓ Apparatus is checked as being isolated where necessary in strict accordance OHS requirements and procedures ✓ Fault finding is approached methodically drawing on knowledge of industrial processes and control apparatus and systems using measured and calculated values of system parameters. ✓ Apparatus components are dismantled where necessary and parts stored to protect them against loss or damage ✓ Faulty components are rechecked and their fault status confirmed. ✓ Unexpected situations are dealt with safely and with the approval of an authorized person. Fault finding activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
3	Rectify fault	Make sure the students answer questions related to the following areas ✓ OHS risk control measures and procedures for carrying out the work are followed. ✓ Apparatus is checked as being isolated where necessary in strict accordance OHS requirements and procedures ✓ Materials required to rectify faults are sourced and obtained in accordance with established procedures. ✓ Repairs are affected efficiently without damage to other components or apparatus and using sustainable energy principles. ✓ Effectiveness of the repair is tested in accordance with established procedures. ✓ Apparatus is reassembled, finally tested and prepared for return to customer.

4	Completion and report fault finding and rectification activities	Make sure the students answer questions related to the following areas ✓ OHS work completion risk control measures and procedures are followed. ✓ Work area is cleaned and made safe in accordance with established procedures. ✓ Written justification is made for repairs to apparatus. Work completion is documented and appropriate person(s) notified in accordance with established procedures

5. TRB/LB =Trainee's Record/Log Book

#	Name of the Source	Information to be checked
1	TRB/LB =Trainee's Record/Log Book	As training progresses, students need to be given "Trainee's Record Book" or "Log Book". Referred book will be used to entry the daily classes and workplace activities and can play an important source of evidence for assessment.
2	TR=Trainer Report	It is expected that every training program will encourage establishment and proper management of all the training records. In this regard, "TR-Trainer Report" or daily training records will illustrate the various training activities being performed and hence can be another important source of information for the assessment.
3	Other Sources	Competency Based Assessment (CBA) adopted for the assessment of this competency unit calls for gathering of evidences and can be from different sources such as S=supervisor/team leader report, C = Certificates, T=Testimonies, VD= Video, P= Photographs, PP= Product produced, S= Simulations, CS= Case Studies,FB= Feedback from Fellow Members and RP= Role Play, etc. Nominated assessor needs to communicate the "Assessment Plan" including the "Different sources of evidence" to the training institution with the commencement of the program to ensure evidence gathering is undertaken on timely manner with presentation of all the required evidence prior to undertaking Final Assessment.


WATER SUPPLY
SYSTEM