**073203T4PLM**

**PLUMBER LEVEL 4**

**CON/OS/PL/CR/02/4/A**

**INSTALL RAINWATER HARVESTING SYSTEMS**

**July/August 2024**

**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)**



**WRITTEN ASSESSMENT.**

**2 HOURS**

**INSTRUCTIONS TO CANDIDATES.**

1. This paper consists of **TWO** sections; **A** and **B.**
2. Answer **ALL** questions in sections **A** and **B** in the answer booklet provided.
3. Marks for each question are indicated in the brackets.
4. Do not write on the question paper.

**This paper consists of SIX (6) printed pages.**

**Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.**

## SECTION A (10 MARKS)

*Answer all questions in this section. Each question carries 1 mark.*

1. Plumbing involves a variety of hand tools to perform tasks such as installing, maintaining, and repairing piping systems, fixtures, and other plumbing-related components. Which tool is used for measuring the slope in a rainwater harvesting systems?
    A. Angle protractor.
    B. Level.
    C. Plumb bob.
    D. Tape measure.
2. Testing the flow in plumbing systems is essential to ensure that the water supply and drainage systems are functioning properly. Why is it important to test the flow rate of harvested water from the downpipes into the storage tank?
    A. To ensure proper filtration.
    B. To prevent over flow.
    C. To maximize water storage.
    D. To minimize water contamination.
3. Plumbing systems rely on a variety of materials, each selected based on their specific properties, such as durability, corrosion resistance, and suitability for different types of fluids. Which of the following materials should be quantified to ensure proper sizing of gutters and downpipes?
    A. Storage tank.
    B. Roof area.
    C. First flush diverter.
    D. Amount of rainfall.
4. What role does policy and regulations play in addressing the challenges of rainwater harvesting?
    A. It decreases system efficiency.
    B. It increases contamination risks.
    C. It exacerbates the challenges.
    D. It mitigates risks and promotes adoption.

5. Gutters are essential components of a building's drainage system, designed to prevent water damage by directing water away from the foundation, walls, and other structural elements. Which method is commonly used to join gutter sections together?
    A. Seam sealer.
    B. Soldering.
    C. Welding.
    D. Riveting.
6. Debris are foreign material or particles that enter and obstruct the plumbing system, causing blockages, reduced flow, or damage to pipes and fixtures. Which tool is essential for removing debris from downpipes during installation of rainwater harvesting system?
    A. Leaf blower.
    B. Gutter scoop.
    C. Long broom.
    D. Garden hose.
7. Harvesting rainwater involves collecting and storing rainwater for later use, offering a sustainable way to manage water resources. Which of the following is the primary component of harvesting rainwater?
    A. Storage tank.
    B. Downspout.
    C. Filtration system.
    D. Gutter.
8. A rainwater harvesting system is a collection of components designed to capture, store, and utilize rainwater efficiently. What is the purpose of a flush diverter in rain water harvesting system?
    A. To divert the first flush of Rain water into the storage tank.
    B. To cut off excess water.
    C. To increase the flow rate of collected rainwater.
    D. To divert the first flush of rainwater away from the storage tank.
9. The following are factors to consider when designing rainwater harvesting system except?
    A. Availability of electricity.
    B. Local regulations permit.

C. Roof material and size.

D. Average annual rainfall.

10. Properly designed and installed joints are essential for the efficiency, durability, and safety of rainwater harvesting systems. What type of joint is typically used for connecting gutter sections along straight runs?

A. Butt joint.

B. Lap joint.

C. Miter joint.

D. Compression joint.

## SECTION B (40 MARKS)

*Answer ALL questions in this section.*

11. Gutters are an integral part of a building's roofing system, designed to collect rainwater and direct it away from the structure. Why do we use gutter wedges when installing gutters? (2 Marks)
12. Screening in the context of rainwater harvesting include the use of mesh or perforated materials to prevent debris from entering the gutter system and subsequently the storage tank. What is the main function of a screening system in a gutter? (2 Marks)
13. Vinyl is the only gutter material that is not a metal used in harvesting water. What are the THREE main components of rainwater harvesting systems? (3 Marks)
14. A plumber is a skilled tradesperson who specializes in installing, maintaining, and repairing systems used for water distribution, drainage, sewage and heating in residential, commercial, and industrial buildings. Name THREE benefits of installing rainwater harvesting systems. (3 Marks)
15. Water can be categorized into various types based on its source, composition, and treatment. State TWO challenges associated with installation of rainwater harvesting. (2 Marks)
16. Rainwater goods is a term used to describe the components of a building's drainage system that are designed to manage rainwater runoff effectively. Describe how rainwater is collected in a rainwater harvesting system. (3 Marks)
17. There are numerous manufacturers of sealants, each offering a variety of products for different applications and industries. List down THREE sealants used during installation of metallic water gutters. (3 Marks)
18. Housekeeping during the installation of gutters is crucial to ensure the efficiency, durability, and safety of the gutter system. Outline THREE methods of conducting housekeeping after installing a gutter. (3 Marks)
19. An effective gutter and downpipe system is essential for managing rainwater runoff from roofs, preventing water damage to buildings and surrounding property, and maintaining the integrity of the structure. Explain how capacity test is done to check an effective gutter and downpipe system. (3 Marks)

20. Safety precautions are measures taken to prevent accidents, injuries, or harm in various environments, activities, or situations. Highlight THREE safety precautions to be observed when installing a gutter. (3 Marks)
21. Several materials are commonly used for gutter installations, each with its own advantages, disadvantages, and suitability for different applications. Identify TWO major advantages of accurately quantifying materials for gutter installations. (2 Marks)
22. Producing drawings or plans while installing rainwater harvesting systems can be extremely beneficial. Give THREE importance of using drawings while installing rainwater harvesting systems. (3 Marks)
23. Installing a rainwater harvesting system involves several steps to effectively capture, store, and utilize rainwater for various purposes. Highlight FOUR common mistakes experienced while installing rainwater harvesting systems. (4 Marks)
24. Creating a sheet metal rainwater harvesting system requires specific tools to cut, shape, and join the metal components effectively. List down TWO forming tools used to make sheet metal rainwater harvesting system. (2 Marks)
25. Unlike traditional exposed gutter systems, which are visible along the edges of the roofline, concealed gutter systems are integrated into the structure of the building, typically within the roof or parapet walls. State TWO disadvantages of concealed gutter system. (2 Marks)



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