073206T4CEN

CIVIL ENGINEERING LEVEL 6

CON/OS/CET/CC/07/6

Apply Water and Wastewater Technology

November/December 2025

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

WRITTEN ASSESSMENT

Time: 3 HOURS

INSTRUCTIONS TO CANDIDATE

1. This paper consists of **TWO** sections: **A** and **B**.
2. Answer **ALL** questions in section A and **ANY THREE** (3) questions in section B.
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a separate answer booklet
5. Do not write on the question paper.

This paper consists of FOUR (4) 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 (40 MARKS)

Answer ALL the questions in this section.

1. As a site engineer, you are required to provide adequate water for mixing concrete, curing works and workers' welfare. List FOUR common sources of water that can be used on a construction site. (4 Marks)
2. During installation of plumbing and external water supply lines for a building project, different types of pipes are selected depending on pressure and durability requirements. State FOUR types of water pipes used in distribution systems. (4 Marks)
3. When setting up a water supply system for a residential estate, various fittings and accessories must be included to regulate and control the flow of water. Describe TWO appurtenances used in water supply systems. (4 Marks)
4. Workers at the treatment plant must follow occupational safety guidelines during daily operations. Outline FOUR safety measures to be observed during water treatment operations. (4 Marks)
5. When designing the plumbing system for a high-rise office block, the water demand must be estimated accurately. List FOUR factors that influence building water demand. (4 Marks)
6. Wastewater generated from site offices, workers' camps and residential buildings must be examined before disposal. Explain TWO characteristics of wastewater. (4 Marks)
7. In planning a sewerage system for an urban estate, the engineer must choose the appropriate type of sewers for wastewater collection. List FOUR types of sewers used in wastewater conveyance. (4 Marks)
8. Manholes, inspection chambers and other sewer appurtenances are essential for maintenance of underground drainage systems. List FOUR common sewer appurtenances. (4 Marks)
9. Engineers must use standard symbols to represent wastewater systems in technical drawings. Name FOUR wastewater symbols used in engineering drawings. (4 Marks)
10. Workplace safety is critical during installation of water and sewer systems on a construction site. State FOUR safety measures that should be observed during water and wastewater works. (4 Marks)

SECTION B (60 MARKS)

Answer THREE Questions in This Section

11.

a. As a site engineer planning water supply for a new housing estate, you must estimate the community's future water requirements. Explain FOUR factors that influence water demand in a community. (8 Marks)

b. When designing the plumbing system for an urban settlement, the engineer must choose an appropriate layout to ensure efficient water supply. With the aid of a neat sketch, illustrate THREE common water distribution layouts. (12 Marks)

12.

a. During a road construction project near a river, you are tasked with providing water for concrete works and dust suppression. Describe FIVE water abstraction methods suitable for surface water sources. (10 Marks)

b. For a proposed municipal water supply project, the treatment plant must ensure clean and safe water before distribution. Explain FIVE water treatment processes applied in conventional treatment plants. (10 Marks)

13.

a. On a busy construction site and surrounding residential area, different activities generate wastewater that requires proper management. Explain FIVE sources of wastewater. (10 Marks)

b. In urban developments, wastewater is treated before being released into the environment. Describe FIVE wastewater treatment processes commonly applied in municipal treatment plants. (10 Marks)

14.

a. When planning a sewerage system for a housing estate, engineers must choose the most suitable drainage method to ensure efficiency and cost-effectiveness. Explain SIX factors to consider when selecting a drainage system. (12 Marks)

b. In road construction and urban development projects, inadequate or poorly designed drainage systems can damage surrounding infrastructure. Explain FOUR major impacts of poor drainage on civil engineering works. (8 Marks)

15.

a. At a construction site or urban development project, proper drainage systems must be installed to control surface runoff and prevent flooding. Explain FOUR methods of site or urban drainage. (8 Marks)

b. Poor drainage in residential estates, roads, or buildings can result in structural and environmental problems. Discuss FOUR impacts of poor drainage on civil infrastructure. (8 Marks)

c. As part of quality control, preventive measures must be adopted during construction and maintenance of drainage works. State FOUR preventive measures against drainage system failure. (4 Marks)