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073105T4PLM

PLUMBING LEVEL 5

CON/OS/PL/CR/03/5

Install Drainage Systems

July/August 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 in section **B.**
3. Marks for each question are as indicated in the brackets
4. You are provided with a separate answer booklet to answer the questions
5. Do not write in this 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** questions in this section.*

1. As a plumber you should identify the symbols commonly found in plumbing drawings. Outline TWO potential issues that could arise on misinterpretation. (2 Marks)
2. During installation of drainage systems, it is important to analyze a drainage plan so as to capture all details. List TWO problems that could arise if a vent pipe is omitted during construction. (2 Marks)
3. To calculate the fall in a section of pipework, there is a need to apply the gradient ratio to the length of the pipe. Calculate the fall in a 100 m section of foul water pipework if the gradient is to be 1:40. (3 Marks)
4. Sanitary fittings are available with changes at various angles. Draw the following bends.
   i. 90° (1Mark)
   ii. 60° (1 Mark)
   iii. 45° (1 Mark)
   iv. 22 ½ ° (1 Mark)
5. When installing an inspection manhole chamber, various materials and components are used. List FOUR materials that are required. (4 Marks)
6. Different types of lines play distinct roles in a drawing. Identify what the following lines represent.
   i. Continuous thick line. (1 Mark)
   ii. Chain Thin with thick ends. (1 Mark)
   iii. Continuous thin zigzag line. (1 Mark)
7. Perspective drawing is a technique used to represent three-dimensional images on a two- dimensional picture plane. List THREE important tools for perspective drawing. (3 Marks)
8. A manhole is a vertical access point that allows inspections. State FOUR properties of a manhole. (4 Marks)
9. Plastic pipe is fabricated in a great variety of compositions. Differentiate between thermoset and thermoplastic plastic pipes. (2 Marks)
10. A variety of different pipework arrangements may be used for different layouts. List THREE pipework arrangements for the collection of discharges from sanitary appliances. (3 Marks)

11. Studying a drainage manhole schedule on a working drawing is crucial aspect while carrying out drainage operations. List THREE problems that could arise if the manhole depths are incorrectly interpreted. (3 Marks)
12. The process of quantifying materials should take into account various site characteristics. Name THREE site conditions that should be accessed when quantifying materials. (3 Marks)
13. Drainage pipes are required in any area to dispose-off waste water from our homes and industrial areas. State FOUR advantages of using PVC drainage Pipes. (4 Marks)

SECTION B: (60 MARKS)

Attempt THREE questions in this section.

14.

a. As a plumber you should identify various components in pipework connections in order to perform smooth operation when given a task. Describe TWO types of traps as used in above drainage pipework connection. (4 Marks)

b. Tools are classified into various classes based on the job requirement. Describe THREE classification of drainage tools and equipment. (6 Marks)

c. You are responsible for ensuring that the drainage system meets regulatory requirements. Explain FIVE primary requirements for an efficient system. (10 Marks)

15.

a. Drainage systems remove waste from a building with the least disruption and impact on our daily lives. Describe FIVE factors to be considered during the design and installation processes. (10 Marks)

b. Plumbing problems can spring up anytime in systems. Discuss FIVE plumbing defects that can arise in drainage systems. (10 Marks)

16.

a) After pipework installation, it is essential to carry out tests to check its workability and effectiveness. Describe the smoke test done in pipework connections. (10 Marks)

b) Safety measures should be observed when using plumbing tools and equipment. Explain FIVE safety measures to be observed while carrying out pipework installation. (10 Marks)

17.

a. The efficient disposal of foul and surface water from a building is of great importance to public health. Describe the following components of below ground drainage.

i. Septic tank. (2 Marks)

ii. Soak pit. (2 Marks)

b. Backfilling of the trenches is done to restore the surface that was excavated to its original state. Describe THREE main steps involved in this operation. (6 Marks)

c. Installation of underground drainage can be done either manually or by use of machines depending on the client's preference. Discuss FIVE disadvantages of manual installation. (10 Marks)