

073205T4BLD

BUILDING TECHNICIAN LEVEL 5

CON/OS/BUT/BC/02/5

Execute Substructure Works

July/August 2025



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

**WRITTEN ASSESSMENT**

**Time: 3 HOURS**

**INSTRUCTIONS TO CANDIDATE**

1. Marks for each question are indicated in the brackets.
2. The paper consists of **TWO** sections: **A** and **B**.
3. Candidates are provided with a separate answer booklet
4. **DO NOT** write on this question paper.



**This paper consists of THREE (3) 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)***Attempt ALL Questions in This Section.*

1. You are executing substructure works as a contractor. With reference to this task, define the following terms;
  - i. Baseline
  - ii. Setting out
  - iii. Foundation (3 Marks)
2. Foundations contribute to stability of a structure. Outline TWO functional requirements of a foundation. (2 Marks)
3. Setting out works precedes excavation works. List THREE equipment used in setting out a building. (3 marks)
4. Setting out requires accuracy in right angle establishment. Outline the setting out of a building using 3:4:5 method. (4 Marks)
5. Hardcore is a crucial component in substructure works. List FOUR functions of hardcore under a foundation slab. (4 Marks)
6. Timbering is guided by the ground conditions. State THREE factors that influence timbering to trenches. (3 Marks)
7. Concrete shaping is required during foundation laying. Give a precise definition of formwork and state its function. (3 marks)
8. Construction of foundation walls requires sound materials. List FOUR advantages of natural stone over other materials for use as foundation walling materials. (4 Marks)
9. It is necessary to treat the soils in execution of substructure works. State TWO the importance of anti-termite treatment. (2 Marks)
10. Underground pressures hinder the structural stability of a structure. Outline TWO kinds of pressures a foundation wall is likely to experience. (4 Marks)
11. Several factors contribute to structural performance and environmental resistance of a foundation wall. List FOUR functional requirements of a foundation wall. (4 Marks)
12. Bonding plays a significant role in masonry stability. With the aid of a sketch, state three rules of bonding. (4 Marks)



**SECTION B (60 MARKS)**

*Attempt any THREE (3) questions in this section.*

13. Stable foundations dictate the stability of the structure.
- Explain THREE factors that determine the choice of a foundation for a building. (6 Marks)
  - Masonry construction comes with various materials. List Three Materials used on a masonry wall. (4 Marks)
  - Transferring measurements to the ground requires precision. With the aid of a sketch, show the setting out of a foundation wall using profile boards. (4 Marks)
  - Bonding in masonry works plays a significant role in the overall strength of the foundation wall. Sketch and label two alternate courses of a Flemish bond. (6 Marks)
14. Mortar should be able to meet certain minimum standards.
- State FOUR functional requirements of mortar used in foundation wall construction. (4 Marks)
  - Anti-termite application is deemed to be necessary in substructure works. Outline the procedure of protecting a building against termite attack in ground floors. (8 Marks)
  - Substructure works consists of different layers, sketch and label a cross section through a solid ground floor. (8 Marks)
15. Foundation design depends on the several factors. Using well labeled sketches, show the details of the following types of foundation;
- Pad foundation
  - Wide strip foundation (20 Marks)
16. Safety is paramount during excavation works.
- List FOUR precautions to be observed when carrying out excavation of trenches. (4 Marks)
  - Moisture penetration should be avoided in buildings, distinguish between a damp-proof course (DPC) and damp-proof membrane (DPM). (4 Marks)
  - The sides of the trench should be supported to prevent it from collapsing.
    - State FOUR factors that influence the method of timbering to trenches. (4 Marks)



- ii. Timbering entails different sizes of timber fixed together, using a well labelled diagram show the details of timbering in loose subsoils.

(8 Marks)

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