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073206T4CEN

CIVIL ENGINEERING LEVEL 6

CON/OS/CET/CC/06/6

Perform Measurement of Works and Cost Estimation

March/April 2026

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

WRITTEN ASSESSMENT

Time: 2 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. Attempt **ALL** the questions in section A and any **THREE (3)** questions in section B.
4. Candidates are provided with a separate answer booklet
5. **DO NOT** write on 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)

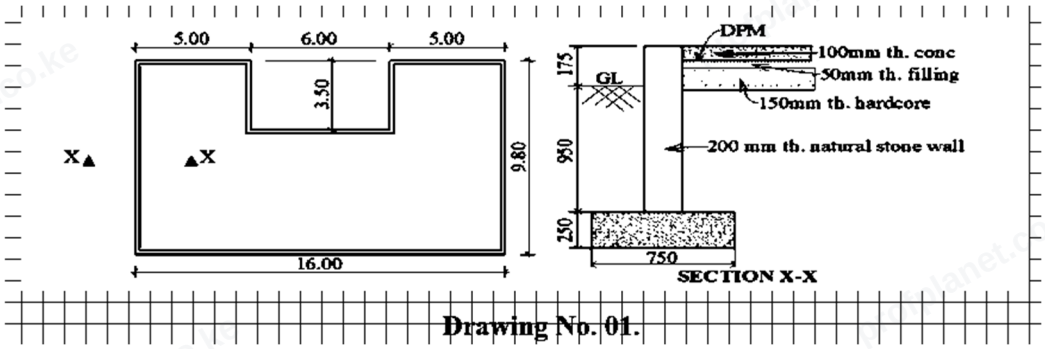
Answer ALL the questions in this section.

1. When preparing tender documents for a medium-sized civil engineering project, working drawings must provide sufficient detail for measurement and costing. State FOUR types of information that must be shown on working drawings to enable preparation of a bill of quantities. (4 Marks)
2. Specification in construction is a detailed written description of materials that guides the factors to be considered when preparing project cost estimates. State FOUR purposes of specifications in the preparation of tender documents. (4 Marks)
3. Before quantities are taken off from drawings, a standard dimension sheet must be prepared. State FOUR features of a correctly prepared dimension sheet used in quantity take-off. (4 Marks)
4. Quantity surveyors rely on standard rules when measuring construction works. List FOUR principles of measurement applied when booking dimensions. (4 Marks)
5. Accurate description of items is required during the taking-off process. State FOUR requirements of a good item description as per the standard methods of measurement (4 Marks)
6. After booking dimensions, numerical operations are carried out to obtain quantities. State FOUR objectives of timesing dimensions during quantity take-off. (4 Marks)
7. Squaring of dimensions is carried out before quantities are abstracted**.** List FOUR errors that may occur if dimensions are not squared correctly. (4 Marks)
8. Abstracting organizes measured quantities for pricing and billing. State FOUR purposes of preparing an abstracting sheet in cost estimation. (4 Marks)
9. Schedule of rates is an important pricing document in tendering. State FOUR sources of information used when preparing a schedule of rates. (4 Marks)
10. Tender documents include legally binding components. State FOUR reasons for including conditions of contract in tender documents. (4 Marks)

SECTION B (60 MARKS)

Answer Any THREE Questions in This Section.

11. A client intends to invite contractors to tender for a civil engineering project and requires complete tender documentation to be prepared.
    a. Explain FOUR key considerations applied when preparing a bill of quantities from working drawings and specifications (8 Marks)
    b. Describe THREE factors considered when preparing conditions of contract for a civil engineering project. (6 Marks)
    c. Outline THREE purposes of preparing a form of tender in the tendering process. (6 Marks)
12. During preparation of a bill of quantities, accurate taking-off of dimensions is required to ensure correct quantities.
    a. Explain FOUR important principles observed when taking dimensions from construction drawings for quantity measurement (8 Marks)
    b. Describe THREE consequences of inaccurate booking of dimensions. (6 Marks)
    c. Highlight THREE reasons for preparing a quantities checklist before measurement begins. (6 Marks)
13.
    a. An estimator is responsible for determining the quantities of materials, labor and equipment required for a construction project. Outline FIVE specific roles performed by an estimator in a construction firm. (10 Marks)
    b. When using rates from previous projects obtained from a quantity surveyor's office, adjustments may be necessary to reflect current project conditions. Discuss FIVE design variables that should be considered when adjusting such rates. (10 Marks)
14. Using the approximate quantities method and the information given in the table1 below, estimate the cost of substructures works shown on drawing No. 01 below. (20 Marks)



Drawing No. 01.

TABLE 1

Description	**Rate in Kshs**
Trench excavation	100/m^3
Backfilling	75/ m^3
Disposal of surplus	80/ m^3
Timbering	150/m^2
Leveling and compacting	60/ m^2
Foundation concrete	12,000/m^3
Foundation walling	1,200/ m^2
Hardcore	700/ m^2
Murram blinding	300/ m^2
Oversite concrete	1,500/ m^2
DPM	70/ m^2

NOTES

i. Allow for use of A93 BRC on 500g DPM, 200kshs/ m^2

ii. Allow for anti – termite treatment on murram blinding, 50kshs/ m^2