2705/204
2707/204
MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS, ESTIMATING AND COSTING I
June/July 2023
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN BUILDING TECHNOLOGY
DIPLOMA IN CIVIL ENGINEERING

MODULE II

MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS, ESTIMATING AND COSTING I

3 hours

You should have the following for this examination:
- *Answer booklet;*
- *Dimension Papers;*
- *Scientific calculator;*
- *A copy of the Standard Method of Measurement of Building works and Associated Civil works for Eastern Africa (SMM).*
- *A copy of Civil Engineering Standard Method of Measurement (CESMM).*

*This paper consists of **SIX** questions in **TWO** sections; **A** and **B**.*
*Answer **FOUR** questions choosing **TWO** questions from each section in the answer booklet provided or dimension papers as necessary.*
Maximum marks for each part of a question are as indicated.
*Questions in section **A** carry **30** marks each while those in section **B** carry **20** marks each.*
Candidates should answer the questions in English.

This paper consists of 7 printed pages.

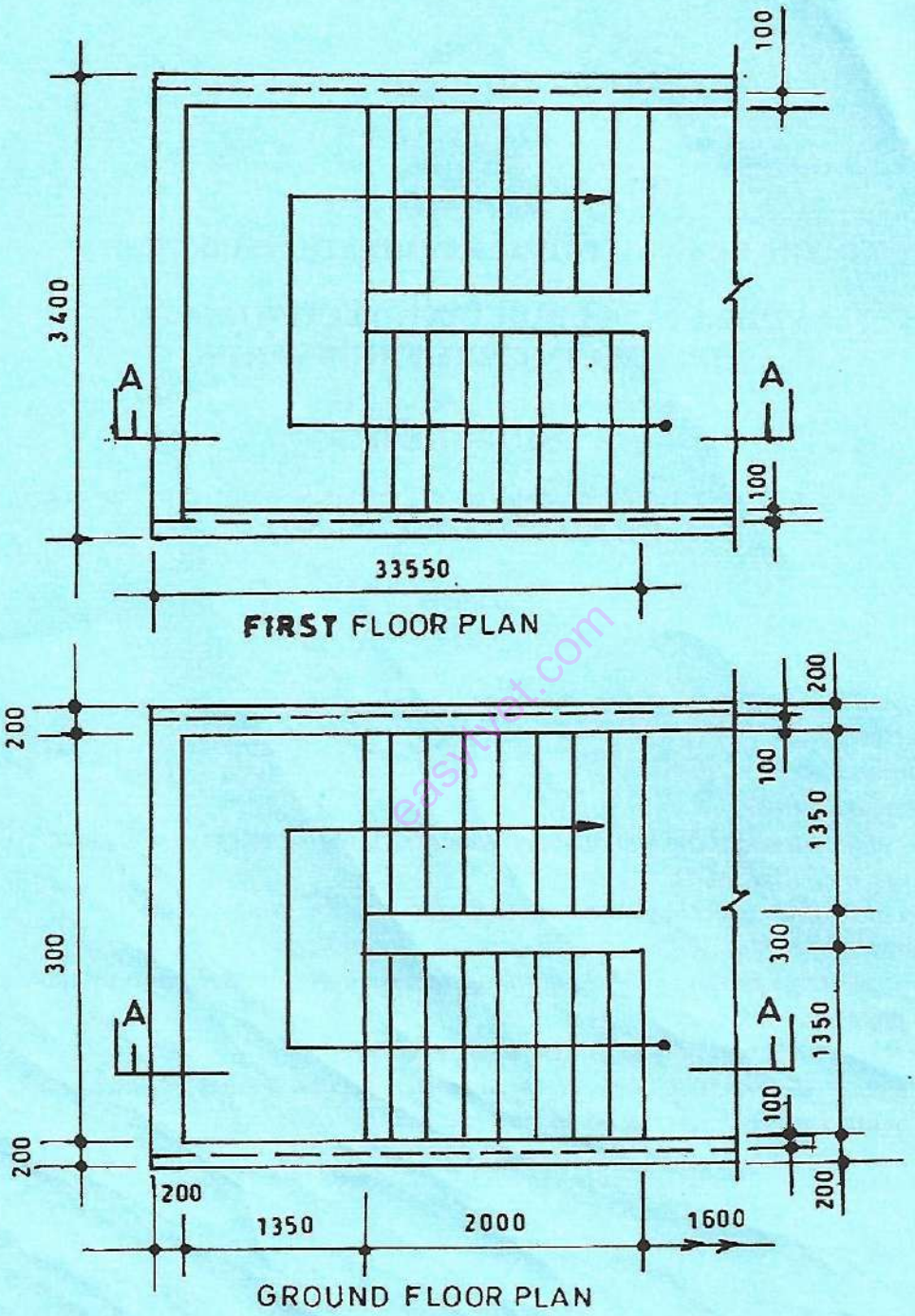
Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

Turn over

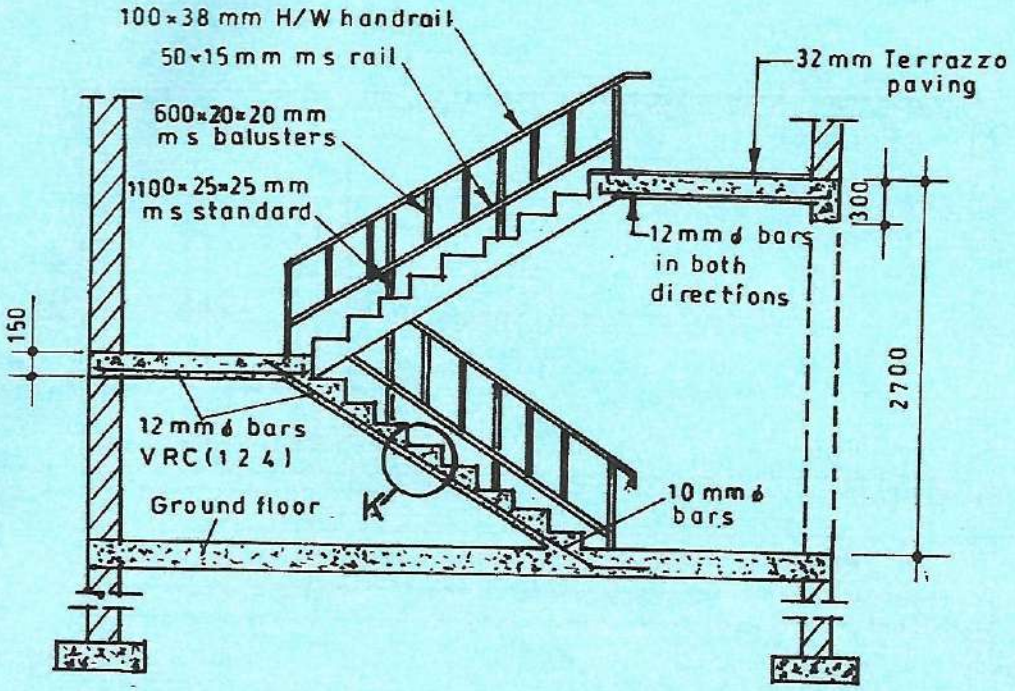
SECTION A: MEASUREMENTS

*Answer **TWO** questions from this section.*

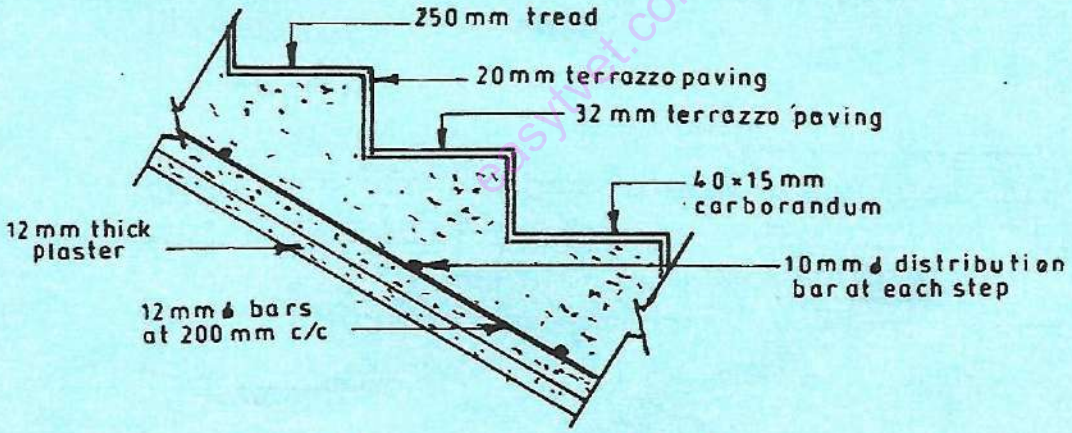
1. Take off all quantities for the staircase work shown on drawing **No. 01 (a) and 1 (b).** (use SMM). (30 marks)



DRG No. 1 (a)



SECTION A–A



Detail K

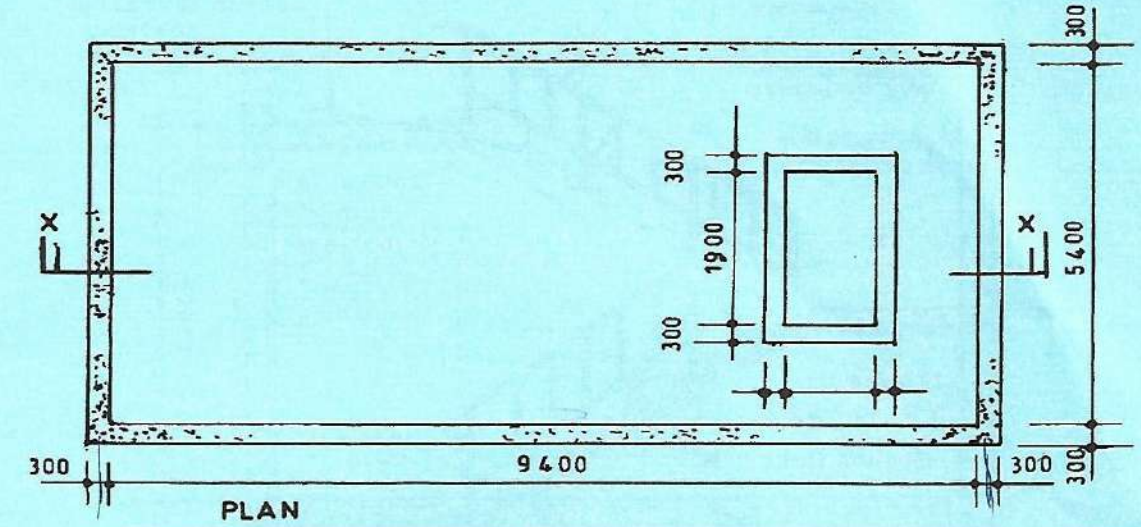
NOTES:

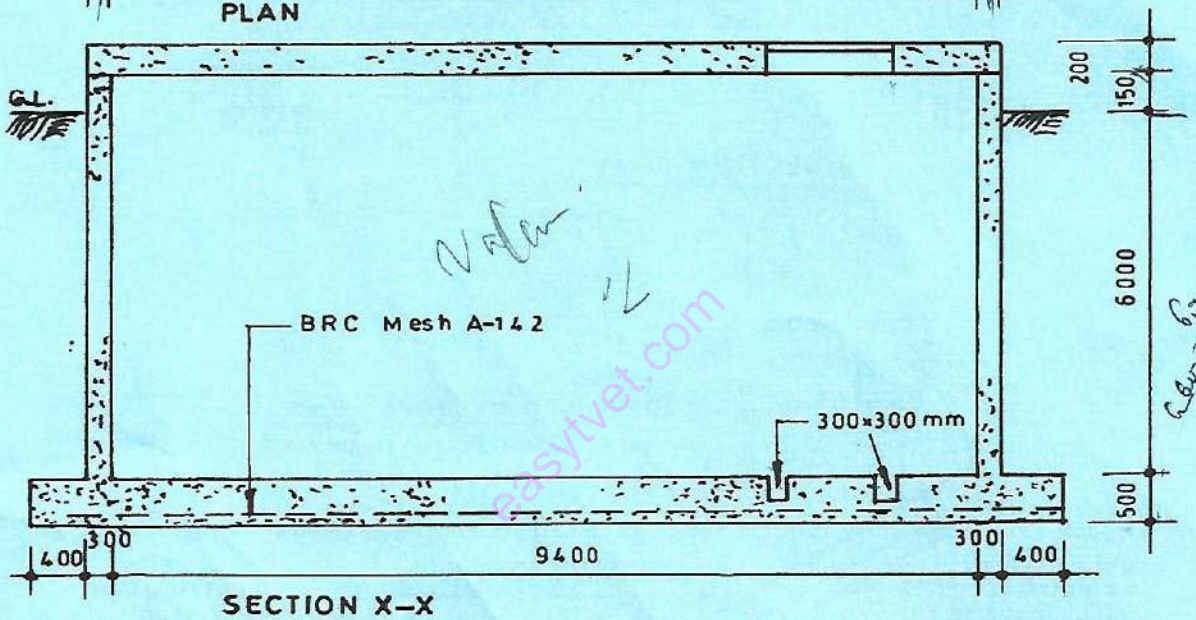
1. 50×6 mm m s plate to be welded on top of all balusters and standards
2. Ignore painting to balustrades
3. Treads 250 mm
4. Risers 150 mm

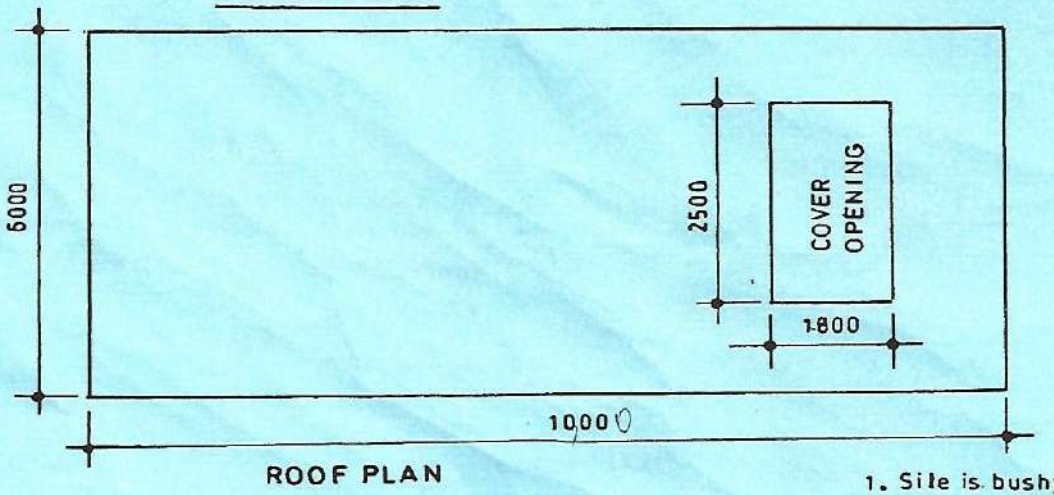
DRG No. 1 (b)

2. Take off all quantities for the machine chamber shown on drawing **No. 02** (use CESMM).

(30 marks)







1. Site is bushy
2. Top soil 200 mm deep

DRG No. 2

(a) Explain each of the following stages used in traditional method of preparing a bill of quantities:

(i) taking off;
(ii) squaring;
(iii) abstracting;
(iv) billing.

(8 marks)

(b) **Figure 1** shows a dimensioning paper. Explain the purpose of each of the columns.

(8 marks)

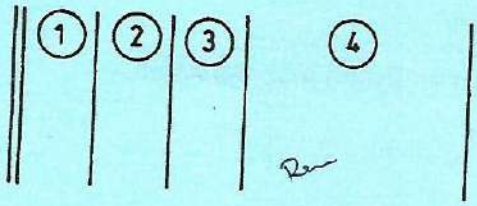


Fig.1

(c) Explain each of the terms as used in bills of quantities:

(i) preambles;
(ii) prime cost sum;
(iii) contingency sum;
(iv) query sheet.

(8 marks)

(d) **Figure 2** shows a bell mouth.

(i) show that the area of the bell mouth is given by $\frac{3}{14}r^2$;

(ii) determine the area of the bell mouth taking r = 5.6 m.

(6 marks)

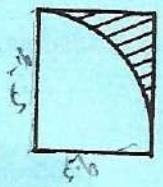


Fig.2

SECTION B: ESTIMATING AND COSTING I

*Answer **TWO** questions from this section.*

4. (a) State **four** roles of a quantity surveyor during the pre-construction period. (4 marks)

(b) State **three** roles of each of the following parties in construction:

(i) contractors;
(ii) subcontractors. (6 marks)

(c) Explain the **three** types of payment certificates in construction. (6 marks)

(d) Outline **four** documents for a valid contract. (4 marks)

5. (a) (i) State **four** methods of minimizing variations.

(ii) Outline **two** methods of valuing variations. (7 marks)

(b) State **six** sources of information for estimating the cost of a construction project. (3 marks)

(c) Explain each of the following terms as used in estimating:

(i) unit rate;

(ii) overheads;

(iii) all-in labour rates. (6 marks)

(d) State **four** disadvantages of the cubic method of approximate estimating. (4 marks)

6. (a) Describe each of the following methods of approximate estimating stating **two** advantages in each case:

(i) functional unit method;

(ii) approximate quantities method;

(iii) superficial enclosure method. (15 marks)

(b) **Figure 3** shows a building to be constructed.

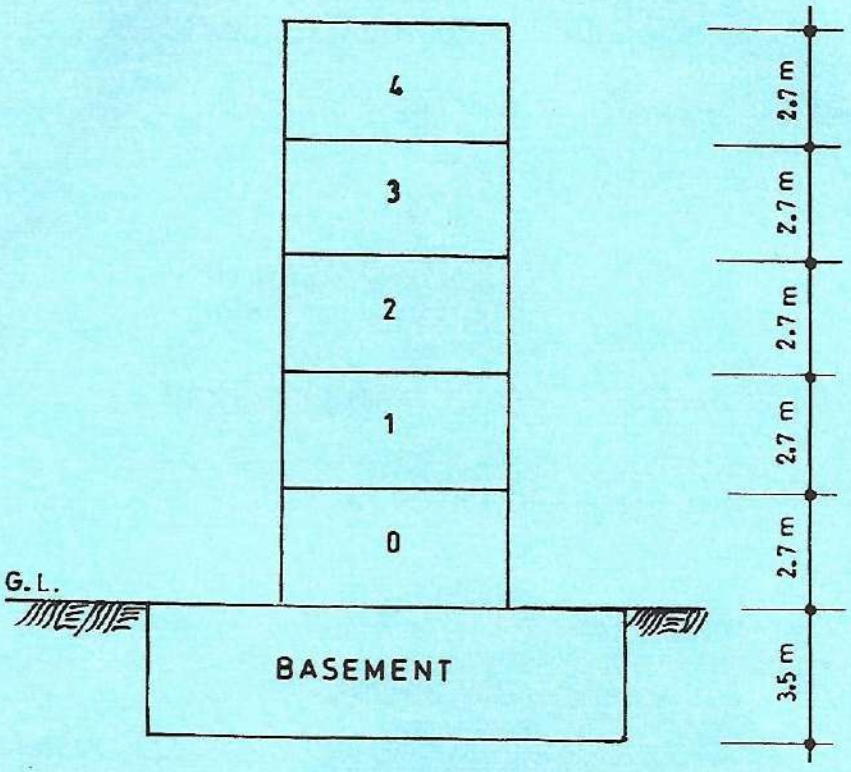


Fig.3

Using superficial method of approximate estimating, estimate the cost of the structure using the following data:

- All external walls are 200 mm thick
- Upper floors external size 38 m x 13 m
- Basement external size 47 m x 15 m
- Unit cost per square metre Ksh 33,900

(5 marks)

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