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**BUILDING CONSTRUCTION I
TECHNICAL DRAWING AND
CONSTRUCTION PLANT**

June/July 2016

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN BUILDING TECHNOLOGY
DIPLOMA IN CIVIL ENGINEERING
DIPLOMA IN ARCHITECTURE**

MODULE I

BUILDING CONSTRUCTION I, TECHNICAL DRAWING AND CONSTRUCTION PLANT

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Drawing paper size A3;

Scientific calculator.

This paper consists of EIGHT questions in THREE sections; A, B and C.

Answer TWO questions in section A, TWO questions in section B and ONE question from section C in the answer booklet provided.

All questions carry equal marks.

Maximum marks for each part of a question are as shown.

Candidates should answer the questions in English.

This paper consists of 6 printed pages.

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

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Turn over

SECTION A: BUILDING CONSTRUCTION I

Answer any **TWO** questions in this section.

1. (a) Define the following terms as used in setting out:
- (i) building line;
 - (ii) base line;
 - (iii) ranging lines. (6 marks)
- (b) With aid of sketches, outline the steps in 3:4:5 method of setting out. (9 marks)
- (c) State any **five** factors that may influence the method of excavation of foundation trenches. (5 marks)
2. (a) With aid of sketches, explain sump method of dewatering. (5 marks)
- (b) Determine the width of a simple strip foundation if the total loading is 60 kN per m and the soil bearing capacity is 100 kN/m². (4 marks)
- (c) Sketch and label a longitudinal section through timbering in a loose wet soil. (5 marks)
- (d) Figure 1 below, is a line diagram of a sloping site. Illustrate the three methods of levelling such a site. (6 marks)



Fig. 01

- Strip soil
- Bulk excavation



3. (a) Outline any **three** functional requirements of a wall. (6 marks)
- (b) Sketch and label the construction of a ground timber floor. (5 marks)
- (c) Figure 2, below is a line diagram of a door frame. Sketch joint detail at point A. (3 marks)



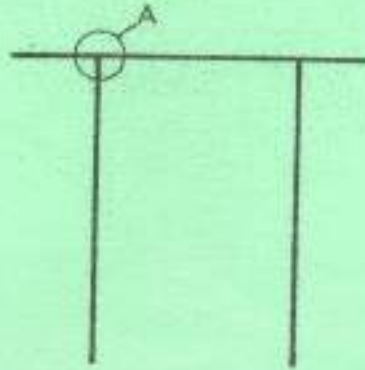


Fig. 02

(d) Figure 3, is door opening in a wall. Sketch the construction detail at point B for the following:

- (i) door frame;
- (ii) door lining.

(6 marks)

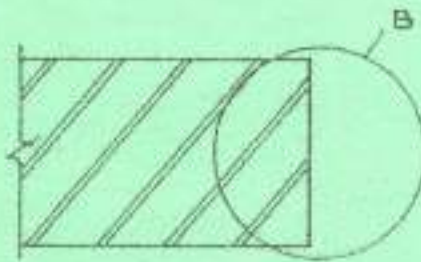


Fig. 03



SECTION B: TECHNICAL DRAWING
Answer any TWO questions from this section.

4. Figure 4 shows an isometric drawing of a block. Using first angle orthographic projection, draw:

- (i) the plan;
- (ii) the front elevation;
- (iii) the side elevation.

(20 marks)

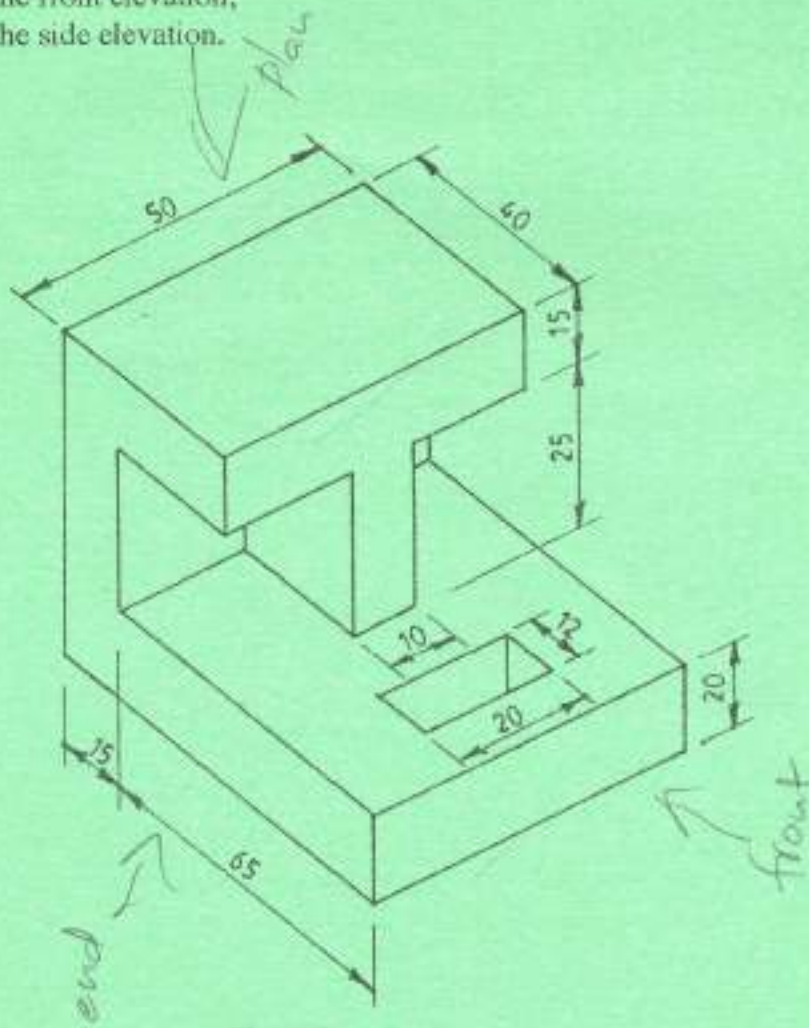


Fig.04

5. Figure 5 shows a machine arm OA rotating in a full circle, clockwise about its end O. The link AB is pivoted at A to AO, the end B of AB is constrained to move by slider in a straight line along OC. Construct the locus of point P on AB.

(20 marks)



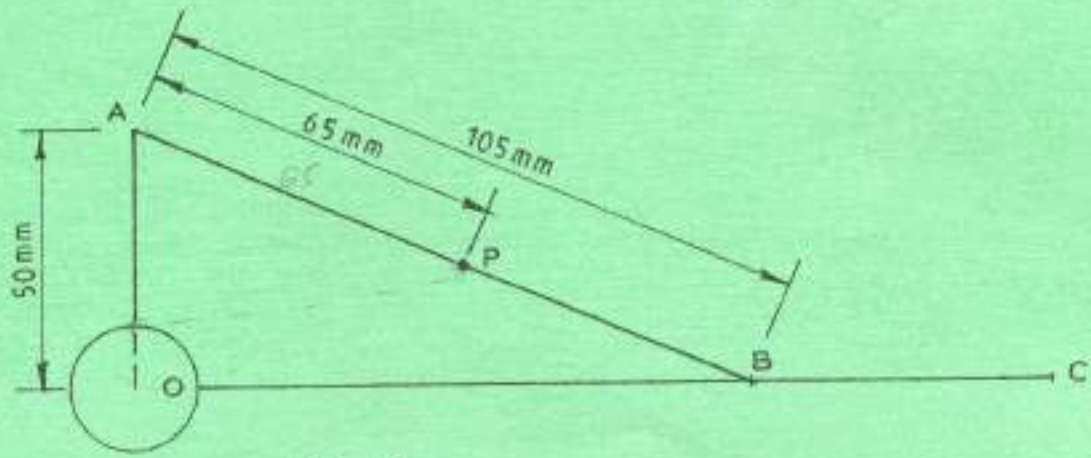


Fig. 05

6. Figure 6 shows the elevation of a truncated square pyramid. Draw:

- (i) the plan;
- (ii) the surface development;
- (iii) the true shape.

(20 marks)

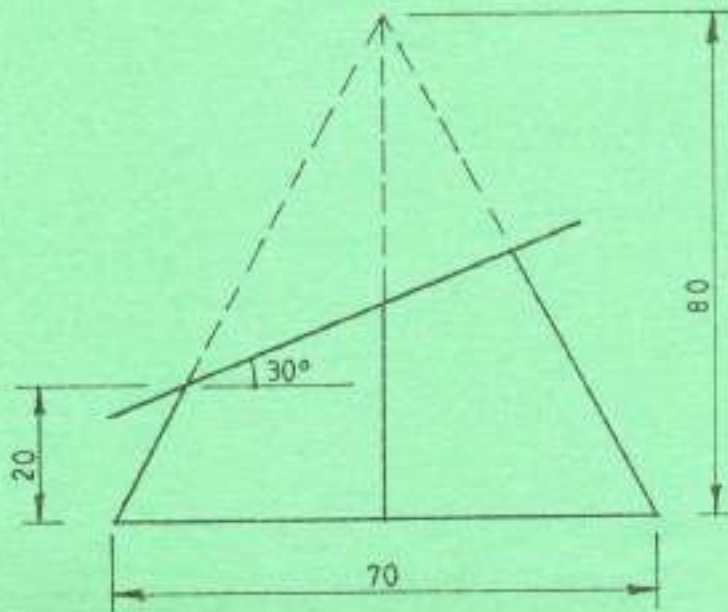


Fig. 06



SECTION C: CONSTRUCTION PLANT

Answer ONE question from this section.

7. (a) State any **four**:
- (i) reasons for using mechanical plant in the construction industry;
 - (ii) factors to consider when selecting excavating plant. (8 marks)
- (b) State **two**:
- (i) merits of owning a plant;
 - (ii) demerits of owning a plant. (4 marks)
- (c) A contractor has a mixer with a drum capacity of 0.45 m^3 with cycle time of 5 minutes. The amount of concrete required will be 200 m^3 . The machine works at 80% efficiency. Assuming a 9 hour working day, determine the number of days it will take to complete the work. (8 marks)
8. (a) State any **four** factors that affect the selection of drilling equipment. (4 marks)
- (b) Explain the following terms as used in blasting:
- (i) stemming;
 - (ii) density. (4 marks)
- (c) Sketch the following circuits used for detonation of explosives:
- (i) parallel;
 - (ii) series;
 - (iii) combined. (6 marks)
- (d) Explain the following terminologies as used in trucks:
- (i) payload;
 - (ii) struck capacity;
 - (iii) heaped capacity. (6 marks)

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