2707/203
CONSTRUCTION MANAGEMENT I,
WORKSHOP TECHNOLOGY II
AND WATER SUPPLY
Oct./Nov. 2021
Time: 3 hours

The 5th #BADA.

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN CIVIL ENGINEERING

MODULE II

CONSTRUCTION MANAGEMENT I, WORKSHOP TECHNOLOGY II AND WATER SUPPLY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
Answer booklet;
Mathematical tables/scientific calculator.
*The paper consists of **EIGHT** questions in **THREE** sections; **A**, **B** and **C**.*
*Answer **FIVE** questions; choosing **THREE** questions from section **A**, **ONE** question from section **B** and **ONE** question from section **C**.*
All questions carry equal marks.
Maximum marks for each part of a question are as indicated.
Candidates should answer the questions in English.

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This paper consists of 5 printed pages.

TEAM VIEWER

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: CONSTRUCTION MANAGEMENT I

*Answer **THREE** questions from this section.*

1. (a) List **five** characteristics of a sound plan. (5 marks)

(b) Define the following terms as used in construction management:

(i) programme;

(ii) budget;

(iii) schedule. (3 marks)

(c) (i) With aid of a sketch, describe a military organization.

(ii) Differentiate between formal organization and informal organization. (7 marks)

(d) (i) Define the management function of directing.

(ii) Delegation is a useful technique of directing. State **four** problems that delegation as a means of directing may give rise to. (5 marks)

2. (a) Explain **five** characteristic features of control in management. (10 marks)

(b) State **six** functions of supervisory management in construction. (6 marks)

(c) List **four** reasons which make coordination necessary as a management function. (4 marks)

3. (a) List **six** essential elements of a valid contract. (6 marks)

(b) Explain the following types of contracts:

(i) express contract;

(ii) implied contract. (4 marks)

(c) Describe the following vitiating elements of a contract:

(i) mistake;

(ii) misrepresentation. (10 marks)

4. (a) Explain the following factors which must be taken into account when planning site layouts:

(i) site activities;

(ii) movement;

(iii) accommodation for staff.

(9 marks)

(b) Explain the following tendering methods:

(i) open tendering;

(ii) selective tendering;

(iii) package deal.

(6 marks)

(c) Highlight **five** roles of a client in a construction project. (5 marks)

SECTION B: WORKSHOP TECHNOLOGY II (ELECTRICAL)

*Answer **ONE** question from this section.*

5. (a) List the components forming composition of a safe and efficient electrical circuit.
(5 marks)

(b) With aid of a labelled diagram, outline the function of each of the components of a consumer control unit. (12 marks)

(c) State the instrument used to measure the following electrical quantities:

(i) electrical current;

(ii) potential difference;

(iii) resistance.

(3 marks)

6. (a) State **one** fault identified by each of the following tests done on an electrical installation:

(i) polarity;

(ii) insulation resistance;

(iii) ring circuit continuity.

(3 marks)

(b) Draw the layout of the following electrical power distribution lines, and in each distributor, show how low voltage and high voltage loads are connected:

(i) 3-wire d.c distributor;

(ii) 4-wire 3 phase a.c distributor.

(14 marks)

(c) State **three** advantages of the grid system of power supply. (3 marks)

SECTION C: WATER SUPPLY

*Answer **ONE** question from this section.*

7. (a) (i) Differentiate between hydrostatics and hydrodynamics in fluid mechanics.

(ii) List the **six** basic units in S.I system of measurement and indicate their symbols.

(8 marks)

(b) Define the following properties of fluids:

(i) mass density;

(ii) specific weight;

(iii) relative density.

(3 marks)

(c) Define the following types of pressure:

(i) gauge pressure;

(ii) absolute pressure.

(2 marks)

(d) **Figure 1** shows a circular gate of 2 m diameter immersed vertically in an oil of specific gravity 0.84. Determine the oil pressure on the gate and position of the centre of pressure on the gate.

(7 marks)

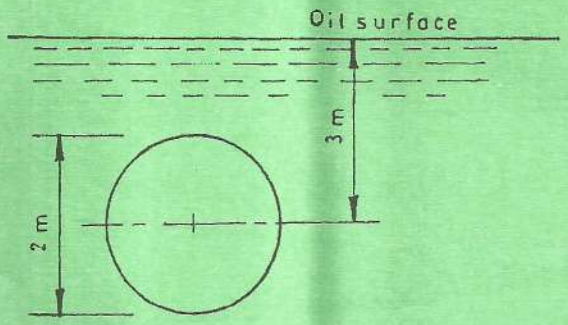

Fig. 1

8. (a) (i) Restate the formula for power required to drive a centrifugal pump.

(ii) A centrifugal pump is required to lift water to a total head of 40 m at a rate of 50 litre/s. Calculate the power required for the pump, if its overall efficiency is 62%.

(6 marks)

(b) Precipitation data for a catchment with an area of 200 km^2 is given in **table 1**. Compute:

(i) the average depth of rainfall for the catchment using Thiessen Polygon method;

(ii) the volume of rain water in m^3 received by the catchment area.

(8 marks)

Table 1

Station No. i	**Rainfall in (mm)** Pi	**Thiessen Polygon area within catchment boundary (km^2)**
1	40	7.2
2	25	10.4
3	37	49.8
4	49	35.8
5	55	6.6
6	38	47.2
7	48	41.5
8	40	1.5

(c) Outline **six** factors considered while selecting the site of a water supply project.

(6 marks)

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