

2707/203
CONSTRUCTION MANAGEMENT I,
WORKSHOP TECHNOLOGY II AND
WATER SUPPLY
June/July 2017
Time: 3 Hours



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/calculator.

This 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 indicated.

Candidates should answer the questions in English.

This paper consists of 5 printed pages.

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

SECTION A: CONSTRUCTION MANAGEMENT I

Answer **THREE** questions from this section.

1. (a) Explain the following management principles as proposed by Henri Fayol:
- (i) division of labour; *capacity*
 - (ii) principle of one boss;
 - (iii) unity of direction;
 - (iv) equity.
- (16 marks)

- (b) Explain the following functions of management:
- (i) staffing;
 - (ii) co-ordination.
- (4 marks)

Resource
Store
Characteristics
concerning

2. (a) A multi-storey office block is to be constructed on a city centre plot. State ten factors to be considered when preparing a site layout plan prior to commencing the contract. (10 marks)

- (b) Outline ten duties and responsibilities of the contractor in a construction project. (10 marks)

manage - Control - presents interim certificates for payment
Give instruction - Finance - program for the activities
order materials for construction in the project

3.

- (a) Explain the following types of contracts: - *acts as a link between the client and the building team.*
- (i) contract of record;
 - (ii) contract under deed;
 - (iii) simple contracts.
- (6 marks)

- (b) With reference to the formation of a contract, state seven principles that apply to the offer. (7 marks)

- the contract must be legal and leave separate
- there must be a writing to create legal relation
- the parties contracting must benefit from the contract
- the contract must have genuine consent

Negotiated - ?
open tendering

- (c) Differentiate between negotiated tendering and serial tendering. (4 marks)

- a builder is asked to tender for one project bearing in mind that if he is successful he will be asked to quote other tenders of the same project.

- (d) State three responsibilities and duties of a structural engineer. (3 marks)

- Making structural drawings
- Giving technical advice where needed in a project

4. (a) Explain four circumstances under which a contract which is apparently complete and valid is vitiated. (12 marks)

- (b) State:
- (i) five factors which influence the choice of appropriate contractual arrangement.
 - (ii) three situations where cost reimbursement contractual arrangement may be preferred for a construction project.
- (8 marks)

SECTION B: WORKSHOP TECHNOLOGY II

Answer ONE question from this section.

5. (a) State:

(i) **three** essential features at every supply point of electricity as required by I.E.E regulations. *Circuit breaker meter*

(ii) **three** advantages of three phase over single phase electrical supply system. *Main switch*
Can be used over a wide area (6 marks)
Can be used with heavy machines

(b) Draw a labelled circuit diagram of a 3-phase 4-wire system supplied from the secondary of a transformer to obtain 415/240 V supply. (6 marks)

(c) State four:

(i) advantages of ring supply system over radial system. *Can be used with*
Can be used over a wide area

(ii) safety precautions to be observed while working on an electrical installation. *uses less materials* *A wide variety of appliances*
1. Ensure power is off *use insulated cables* (8 marks)
2. Wear protective gear *Ensure correct matching*

6. (a) Explain the following terms as applied to electrical installations:

(i) final circuit;

(ii) accessory.

(4 marks)

(b) List five classifications of accessories and equipment used in electrical circuits and state two examples in each case. (10 marks)

(c) (i) State four factors considered when determining the size of conductor to be used for a given final circuit.

(ii) A 5 amp fuse under test was found to blow when the overload current in the circuit was 8 Amps. Calculate the fusing factor for the fuse.

(6 marks)

SECTION C: WATER SUPPLY

Answer **ONE** question from this section.

7. (a) A triangular plate 2 m base and 3 m height is immersed vertically in water such that its top is 1 m below the water surface as shown in figure 1. Find the total pressure and the position of centre of pressure on the plate. (9 marks)

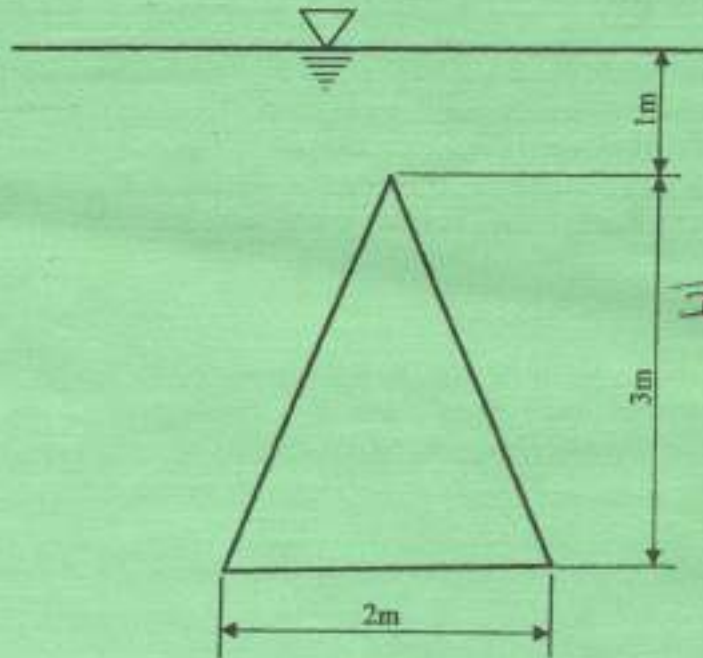


Fig. 1

- (b) (i) With the aid of a diagram derive an expression for theoretical discharge through a horizontal venturimeter and show how it is modified to obtain the actual discharge.
- (ii) A venturi tube tapers from 300 mm in diameter at the entrance to 100 mm in diameter at the throat, and the discharge coefficient is 0.98. A differential mercury U - tube gauge is connected between pressure tapplings at the entrance and the throat. If the meter is used to measure the flow of water and the water fills the leads to the U-tube and is in contact with the mercury, calculate the discharge when the difference of levels in the U - tube is 55 mm. (11 marks)

8. (a) State **four** factors considered in the selection of a site for stage measurement in stream gauging. (4 marks)
- (b) State **five** factors considered in the selection of a pump. ^{- cost} ^{- efficiency} ^{- availability} (5 marks)
- (c) Highlight **four** comparisons between mechanically operated and baffle type mixing basins. (4 marks)
- (d) With the aid of sketches describe:
- (i) horizontal round the end mixing basin;
- (ii) vertical over and under type mixing basin. (7 marks)

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