

2707/203
CONSTRUCTION MANAGEMENT I, WORKSHOP
TECHNOLOGY AND WATER SUPPLY
Oct./Nov. 2016
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN CIVIL ENGINEERING

MODULE II

CONSTRUCTION MANAGEMENT I, WORKSHOP TECHNOLOGY
AND WATER SUPPLY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Mathematical tables/Scientific 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 as shown.

Candidates should answer the questions in English.

This paper consists of 4 printed pages.

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

SECTION A: CONSTRUCTION MANAGEMENT I

Answer **THREE** questions from this section.

1. (a) Highlight **six** duties of the Quantity Surveyor during construction period. (6 marks)
- (b) With the aid of a diagram explain the various elements in the process of communication. (10 marks)
- (c) Communication is part and parcel of the overall management function. State **four** functions of communication. (4 marks)

2. (a) (i) Outline **four** features of a matrix structure of organization.
 (ii) State **six** advantages of matrix structure of organization. (10 marks)
- (b) Explain the following principles of organisation:
 - (i) delegation;
 - (ii) balance;
 - (iii) span of control. (6 marks)
- (c) State **four** functions of control management. (4 marks)

3. (a) Explain the provision of the following on a construction site:
 - (i) the contractors site offices;
 - (ii) site services;
 - (iii) access to the works. (9 marks)
- (b) Differentiate:
 - (i) a binding contract from other agreements;
 - (ii) a void and a voidable contract. (6 marks)
- (c) (i) Describe a joint venture.
 (ii) State **two** advantages of a joint venture. (5 marks)

4. (a) State **three** advantages and **three** disadvantages of each of the following:
 - (i) open tendering;
 - (ii) design and build contract. (12 marks)
- (b) Outline **eight** functions of contract documents. (8 marks)

specification
work area
define and class

SECTION B: WORKSHOP TECHNOLOGY

Plan
Control
Command
Co-ordinate

Answer ONE question from this section.

5. (a) Explain **four** methods used in protection against electric shock for workshop equipment. (12 marks)
 - Earthing
- Insulation
- Circuit breaker
- (b) State:
 (i) **Four** types of metal conduit fittings. - Heavy gauge, single gauge, silver grey, black enamel
 (ii) **One** are of application for each of the following:
 (I) black enamel conduit;
 (II) silver grey conduit.
 (iii) **Two** advantages of trunking over conduit wiring system. (8 marks)
6. (a) State **four** tests that may be performed on a completed electrical installation and name **one** instrument used for each case. (8 marks)
 - Resistance test
- Insulation resistance test
- Continuity test
- Polarity test
- (b) Sketch a labelled diagram to show how electrical power may be supplied to portable tools on a construction site. (4 marks)
- (c) Explain:
 (i) why the size of cable must be related to the circuit over current device.
 (ii) the need to subdivide circuits even in the smallest installations. (8 marks)

SECTION C: WATER SUPPLY

Answer ONE question from this section.

$$Q = A C \sqrt{m i}$$

7. (a) The cross-section of an open channel is a trapezium with a bottom width B of 3.6 m and side slopes of 1 vertical to 2 horizontal. Assuming that C in the Chezy formula is 49 , determine the discharge if the depth of water is 1.2 m, and the slope i of bed is 1 in 1600 . (7 marks)
 $Q = A C \sqrt{m i}$
- (b) Water is discharged from a reservoir into the atmosphere through a pipe 39 m long. There is a sharp entrance to the pipe and the diameter is 50 mm for the first 15 m from the entrance. The pipe then enlarges suddenly to 75 mm in diameter for the remainder of its length. Taking into account the loss of head at entry and at the enlargement, calculate the difference of level between the surface of the reservoir and the pipe exit which will maintain a flow of 2.8 l/s. Take $f = 0.0048$ for the 50 mm pipe and 0.0058 for the 75 mm pipe in the Darcy's formula. (8 marks)
 $H_f = V L F$
- (c) State **five** factors considered when selecting a pump. (5 marks)

8. (a) Outline **six** requirements in the installation of standard rain gauge. (6 marks)
- (b) A circular plate of 1 m diameter is immersed in water such that its plane makes an angle of 30° with the horizontal and its top edge is 1.5 m below the free water surface. Determine the total pressure acting on the plate and the position of centre of pressure from the liquid surface. (5 marks)
- (c) State **four** reasons for water treatment. (4 marks)
- (d) Design a sedimentation tank to treat 9,092 million litres per day of turbid water. Assume the following data:
- | | | | | |
|---|------------------|---|--------------|-----------|
| - | detention period | = | 5 hours | |
| - | velocity of flow | = | 15 cm/minute | |
| - | depth of tank | = | 4 m | (5 marks) |

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