2707/203
CONSTRUCTION MANAGEMENT I, WORKSHOP
TECHNOLOGY II AND WATER SUPPLY
June/July 2022
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/scientific calculator.
This paper consists of EIGHT questions in THREE sections; A, B and C.
Answer any 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.

SECTION A: CONSTRUCTION MANAGEMENT

Answer THREE questions from this section.

1. (a) Describe the following types of contractors:

     (i) speculative builders;

     (ii) medium contractors.   (8 marks)

   (b) Explain the following principles of organization which help in designing a sound organization structure:

     (i) unity of objectives;

     (ii) efficiency;

     (iii) division of work;

     (iv) span of control;

     (v) scalar principle;

     (vi) unity of command.   (12 marks)

2. (a) List **six** factors which must be taken into account when planning site layout.   (6 marks)

   (b) State the information that an electricity company will require to supply a metered supply of electricity on a new site.   (6 marks)

   (c) Outline **four** advantages of using artificial lighting on a construction site.   (6 marks)

   (d) State **two** benefits of site layout planning.   (2 marks)

3. (a) Highlight **six** functions of contract documents.   (6 marks)

   (b) State **four** principles of filing system.   (4 marks)

   (c) Explain the following causes of communication breakdown in an organization:

     (i) poor expression;

     (ii) poor choice of method;

     (iii) status difference;

     (iv) overloading;

     (v) distance.   (10 marks)

4. (a) (i) Explain the following:

        (I) counter offer;

        (II) cross offer.

(ii) Describe the following contracts:

    (I)   cost Reimbursement contracts;

    (II)   target cost contracts   (10 marks)

(b)   Describe the following causes of terminator of offer in a valid contract.

    (i)   Revocation;
    (ii)   Lapse of time.   (6 marks)

(c)   State **four** methods by which contracts are discharged.   (4 marks)

SECTION B: WORKSHOP TECHNOLOGY II (ELECTRICAL)

Answer ONE question from this section.

5.   (a)   List **five** classifications of electrical accessories giving **one** example in each case.   (5 marks)

    (b)   State **three** factors that affect the current rating of cables.   (3 marks)

    (c)   Sketch and label a P.V.C insulated and sheathed twin earthed flat cable and state the function of each part.   (6 marks)

    (d)   Sketch and label to show a looping-in method of wiring a lighting sub-circuit in a conduit wiring system.   (6 marks)

6.   (a)   Sketch and label a single line diagram to show the control equipment of a domestic water heating system at the intake point, including an off-peak water heating system.   (6 marks)

    (b)   (i)   Sketch and label a wiring circuit diagram to show the process of measuring the value of resistance using voltmeter and an ameter.
         (ii)   state the formula of calculating resistance.   (6 marks)

    (c)   State the recommended size of cable and fuse rating in each of the following in a consumer control unit:

    (i)   lighting circuit;
    (ii)   ring power circuit;
    (iii)   water heater circuit;
    (iv)   cooker circuit.   (4 marks)

    (d)   Highlighting **four** precautions to be observed while working on an electrical installation.   (4 marks)

SECTION C: WATER SUPPLY

Answer ONE question from this section.

7. (a) A 300 x 150 mm venturimeter is provided in a vertical pipeline conveying oil of specific gravity 0.9, the flow being upwards. The difference in elevation of the throat and entrance sections of the venturimeter is 300 mm.
   Calculate:
   (i) discharge of the oil,
   (ii) pressure difference between the entrance and the throat section.
   Take;
   Coefficient of meter = 0.98,
   Specific gravity of mercury = 13.6
   Manometer reading = 250 mm. (8 marks)

   (b) (i) Outline **three** parts of a reciprocating pump stating their functions.
   (ii) With the aid of a labelled sketch, explain the operation of a reciprocating pump. (11 marks)

   (c) State **two** classifications of water turbines. (1 mark)

8. (a) (i) Define precipitation;
   (ii) List **six** precipitation losses. (4 marks)

   (b) A vertical sluice gate 3m wide and 2.5 m deep contains water on both of its sides. On the upstream side, the water is 5 m deep and on the downstream side, its is 2m deep from the bottom of the sluice. With the aid of a sketch, determine the resultant pressure on the gate, (8 marks)

   (c) (i) List **five** purposes of water treatment.
   (ii) List **three** layout components of a water supply. (8 marks)

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