2306/303
BUILDING CONSTRUCTION, CIVIL ENGINEERING
CONSTRUCTION AND DRAWING
Oct./Nov. 2016
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN QUANTITY SURVEYING

BUILDING CONSTRUCTION, CIVIL ENGINEERING
CONSTRUCTION AND DRAWING

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
- *answer booklet;*
- *drawing instruments;*
- *drawing Paper size A2.*

*This paper consists of **EIGHT** questions in **THREE** sections; **A**, **B** and **C**.*
*Answer **FIVE** questions; **TWO** questions from section **A**, **TWO** questions from section **B** and **ONE** question from section **C** in the answer booklet provided.*
Maximum marks for each part of a question are as indicated.
Candidates should answer the questions in English.

This paper consists of 4 printed pages.

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: BUILDING CONSTRUCTION

*Answer **TWO** questions from this section.*

1. (a) State **four** advantages of natural stones over bricks in masonry construction. (4 marks)

   (b) With the aid of a labelled sketch, describe a bifurcated stair. (5 marks)

   (c) Outline **four** basic requirements for curtain walls. (6 marks)

2. (a) State **four** factors considered in locating manholes in a drainage system. (4 marks)

   (b) Sketch **two** single storey portal frame formats. (6 marks)

   (c) Outline **five** advantages of framed structures. (5 marks)

3. (a) State the cause of the following accoustic defects.

   (i) excessive reverberation;
   (ii) echoes;
   (iii) high background noise. (3 marks)

   (b) Explain each of the following painting defects:

   (i) blistering;
   (ii) flaking;
   (iii) sponification;
   (iv) fading. (6 marks)

   (c) With the aid of a sketch, describe a rigid joint in a drainage system. (6 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION

*Answer **TWO** questions from this section.*

4. (a) Outline **four** precautions to be taken to avoid tilts and shifts in the construction of caissons. (4 marks)

   (b) (i) Highlight **three** methods of holding caissons into position during sinking.
   (ii) State **three** disadvantages of sand island method of sinking caissons. (6 marks)

   (c) Sketch and label a section through the following types of cofferdams:

   (i) double wall cofferdam;
   (ii) cellular cofferdam. (5 marks)

5. (a) Sketch and label the following types of roads:

(i) tellford;
(ii) macadam. (8 marks)

(b) State **four** functions of water front structures. (4 marks)

(c) Outline **three** reasons for dredging. (3 marks)

6. (a) State **two** types of weirs under each of the following:

(i) according to the nature of crest;
(ii) according to the contractions. (4 marks)

(b) Highlight **five** factors to be considered when selecting a drilling method for a well. (5 marks)

(c) (i) State **two** reasons for underpinning.
(ii) Sketch and label a root pile underpinning. (6 marks)

SECTION C: DRAWING

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

7. (a) Using the data below, draw a section through a circular open caisson to a scale of 1:20.

Pier top	1500 mm
Pier bottom	2200 mm
Staining thickness	300 mm
External diameter of the wall	2500
Top plug thickness	300 mm
Well cap thickness	250 mm
Projections of well cap	200 mm
Depth of caisson	300 mm
Bottom plug thickness	500 mm
Depth of curb	500 mm
Pier height	800 mm
Water level	300 mm below the top plug

(25 marks)

(b) Using the data below and a scale of 1:20, draw the plan and section through a combined trapezoidal strip foundation footing.

Length of the footing	5000 mm
Distance of columns from the edge	500 mm
Column sizes	500 x 500 mm
Longest width	3000 mm
Shortest width	2000 mm
Strip thickness	500 mm

(15 marks)

8 (a) To a scale of 1:20, draw and label a vertical section through a cantilever retaining wall given the following information.

Stem height above ground level	400 mm
Depth of stem below ground level	600 mm
Stem	
Arm thickness at the top	250 mm
Arm thickness at the bottom	1000 mm
Length of the heel at the top	700 mm
Length of the heel at the bottom	600 mm
Length of the toe	1400 mm
Heel, toe and Key	
Thickness of toe	300 mm
Thickness of heel	200 mm and of key 300 mm
Depth of key from the heel side	480 mm
Reinforcement	
Main bars	Y 20 @ 200 c/c
Distribution bars	Y 12 @ 300 c/c

Assume any other information. (20 marks)

(b) To a scale of 1:20, draw a cross section through a 5.0 m wide single carriage way given the data below.

Sub base	300 mm
Road base	125 mm
Pre mix surfacing	50 mm
Road kerb	250 x 450 mm
Camber	0.25
Foot path	
Width	1200 mm
Cross foil	3%

One coat surface dressing over 100 mm gravel. (20 marks)

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