2306/303
BUILDING CONSTRUCTION, CIVIL ENGINEERING CONSTRUCTION AND DRAWING
Oct./Nov. 2017
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN QUANTITY SURVEY

BUILDING CONSTRUCTION, CIVIL ENGINEERING CONSTRUCTION AND DRAWING

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
- *Answer booklet;*
- *Drawing paper size A3;*
- *Drawing instruments.*

*This paper consists of **EIGHT** questions in **THREE** sections; **A, B** and **C**.*
*Answer any **FIVE** questions by choosing **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 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.

Turn over

SECTION A: BUILDING CONSTRUCTION

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

1. (a) State **five** conditions that necessitate ventilation in a building. (5 marks)

   (b) Sketch and label a section through a traditional concrete underpinning. (5 marks)

   (c) State the functions of each of the following internal fixings:

   (i) architrave;
   (ii) skirting;
   (iii) dado rails;
   (iv) frieze rails;
   (v) cornice.

   (5 marks)

2. (a) State **three** merits of ribbed floors. (3 marks)

   (b) **Figure 1** shows a timber louvered window. Sketch and label section C-C. (4 marks)

Figure 1

   (c) Sketch and label a section through each of the following types of road forms in pavement construction:

   (i) standard;
   (ii) flexible.

   (8 marks)

3. (a) Outline the procedure of grass planting during landscaping. (6 marks)

(b) **Figure 2** shows a line diagram of a steel portal frame roof. Sketch and label details A and B. (6 marks)

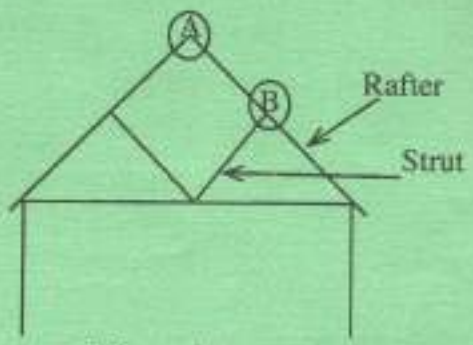

Figure 2

(c) State **six** causes of a smoky chimney. (3 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION

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

4. (a) State **two**:

(i) reasons for dredging;
(ii) factors that influence selection of cofferdams;
(iii) functions of water front structures.

(6 marks)

(b) Explain each of the following failures in earth dams:

(i) piping;
(ii) sloughing.

(4 marks)

(c) With the aid of a labelled sketch, explain concrete trough spillway. (5 marks)

5. (a) With the aid of a labelled sketch, describe the primary treatment of waste water. (6 marks)

(b) Sketch and label square bridge joint in a railway line. (3 marks)

(c) Explain each of the following:

(i) aquifer;
(ii) well foundation;
(iii) secondary feeder.

(6 marks)

6. (a) With the aid of a labelled sketch, outline the procedure of construction of a rigid pavement road. (9 marks)

(b) Sketch and label each of the following types of bridges:

(i) bascule;
(ii) cable stayed.

(6 marks)

SECTION C: DRAWING

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

7. (a) A bridge deck is to be supported by square piers on 3000 x 3000 pad foundations. Using the data given below and to a scale of 1:50 draw a longitudinal section of the bridge. (25 marks)

Data

Effective span between piers	6500 mm
Lower thickness of pier	2000 mm
Upper thickness of the pier	1200 mm
Height from rive bend to soffit	3000 mm
Highest water level	2500 mm
Square pad thickness	500 mm
Beam thickness	200 mm
Thickness of the deck slab	250 mm
Expansion gap	50 mm
Height of guardrail	1000 mm
Ball bearing diameter	500 mm

(b) Draw a section through a manhole to a scale of 1:10 using the following date:

Effective size	800 x 800 mm
Concrete base thickness	200 mm
Mosonry wall height	1000 mm
Beam	150 mm
Mild steel cover	30 mm thick
Concrete base size	1400 x 1400 mm
Plaster	20 mm

Inlet and outlet pipe 100 mm ϕ at 100 mm from the base concrete.

(15 marks)

8. (a) A building is to have a dog leg stair constructed in reinforced concrete. Design and to a scale of 1:25 draw he stair using the following data. (20 marks)

Floor to headroom height	2800 mm
Floor thickness	200 mm
Size of riser	150 mm
Flight width	900 mm
Stair width	2000 mm
Stair length	3450 mm
Landing	1200 mm
Waist	150 mm
Metal standards	25 x 25 x 1050 mm
Ms balusters	20 x 20 550 mm
Handrail	50 x 50 mm
Main reinforcements	Y12 @ 200 mm c/c
Distribution bars	Y10 @ 250 mm c/c
Metal rail	50 x 20 mm

(b) To a scale of 1:50 draw a cross section through a 6000 mm single carriage way using the following data:

Crushed stones	3500 mm
Sub base	500 mm
Asphalt premix surfacing	50 mm
Road kerb	250 x 500 mm
Comber	2.5 %
Flush channel	250 x 250 mm

Trapezoidal earth drain 500 mm at the base.

Footpath (both sides) 1500 mm wide with one coat surface dressing over 200 mm gravel and a cross fall of 3%.

(20 marks)

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