Name:_____ Index No.:_____/_____

2306/303
BUILDING CONSTRUCTION, CIVIL ENGINEERING CONSTRUCTION AND DRAWING
Oct./Nov. 2014
Time: 3 hours

Candidate's Signature:_____

Date:_____

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN QUANTITY SURVEYING

BUILDING CONSTRUCTION, CIVIL ENGINEERING CONSTRUCTION AND DRAWING

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.
Sign and write the date of examination in the spaces provided above.
You should have the following for this examination:
Scientific calculator;
Drawing instruments.
*This paper consists of **EIGHT** questions in **THREE** sections: **A**, **B** and **C**.*
*Answer **FIVE** questions choosing **TWO** questions from section **A**, **TWO** questions from section **B** and **ONE** question from section **C**.*
*Questions in section **A** and **B** carry **15** marks each while those in section **C** carry **40** marks each.*
Maximum marks for each part of a question are as indicated.
Candidates should answer the questions in English.

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A		15	
		15	
B		15	
		15	
C		40	
		TOTAL SCORE	

This paper consists of 20 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 **three** objectives of incorporating the Land Registration (L.R.) number on drawings submitted for approval by the Local Authority. (3 marks)

   (b) Outline **four** factors that influence the method of subsoil investigation for a construction site. (6 marks)

   (c) Sketch and label a vertical cross-section through a beam and slab raft foundation. (6 marks)

2. (a) Illustrate **two** methods of levelling a slopping building site giving **one** advantage of each. (6 marks)

   (b) (i) Outline **three** types of walls.

   (ii) Explain the purpose of bonding in a masonry wall.

   (iii) Outline **three** advantages of using machine dressed stones. (9 marks)

3. (a) Sketch and label the following types of shores:

   (i) raking shores;

   (ii) flying shores. (6 marks)

   (b) Describe each of the following with respect to airborne sound in a building:

   (i) sound insulation;

   (ii) sound absorption. (4 marks)

   (c) State **two** methods of classifying windows and list **three** examples in each case. (5 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION

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

4. (a) Explain **two** reasons for underpinning a building. (4 marks)

(b) Sketch and label a vertical section through a breakwater structure. (4 marks)

(c) (i) Sketch and label a digging dredger.

(ii) Describe the operations of a digging dredger. (7 marks)

5. (a) Describe each of the following in railway trucks:

(i) crossovers;

(ii) switch rails;

(iii) frog. (6 marks)

(b) Outline **four** situations necessitating the use of culverts. (6 marks)

(c) Outline **three** considerations made in the construction of steel arch bridges. (3 marks)

6. (a) (i) State **five** principles considered in the design of dams.

(ii) State **three** modes of failure in earth dams. (9 marks)

(b) Describe each of the following stages in water treatment:

(i) fine screening;

(ii) course screening;

(iii) coagulation;

(iv) sedimentation. (6 marks)

SECTION C: DRAWING

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

7. (a) To a scale of 1:50, draw and label a half cross section through a 6.0 m single carriage way given the following information. (18 marks)

Information

Improved subgrade	-	250 mm
Crushed stone sub-base	-	350 mm
Graded crushed stone road base	-	125 mm
Asphalt premix surfacing	-	50 mm
Road kerb	-	125 x 250 mm
Camber	-	2.5 per cent

Footpath (both sides) 1.5 m wide with one coat surface dressing over 100 mm gravel and a crossfall of 3 per cent.

Semi-circular invert block drains 450 x 125 mm

75 mm compacted murram under the drain and 50 mm thick concrete providing the lateral stability.

Assume any other relevant information not given.

(b) To a scale of 1: 20, draw and label a section through internal tanking in mastic asphalt to a basement given the following information. (22 marks)

DATA

Floor to floor height - 3.80 m
R.C. floor slab 250 mm thick.
Internal protective wall of concrete block work - 150 mm
30 mm coat vertical mastic asphalt - 20 mm thick.
$1\frac{1}{2}$ brick basement wall.
R.C. loading slab 250 mm thick.
50 mm cement/sand (1:3) protective screed.
3 coat horizontal mastic asphalt 30 mm thick.
200 mm thick mass concrete (1:3:6) base.

Assume any other relevant information not given.

8. (a) A maisonette is to have two flights of stairs with half space landing constructed in reinforced concrete using the following information, and to a scale of 1:20, draw:

(i) the plan of the stairs;

(ii) the section through the first flight of the stair showing the reinforcement and balustrades in position. (25 marks)

Information
Floor to floor height is 3000 mm.
Stair well is 2000 mm wide and bounded by 200 mm thick block wall.
Floor thickness is 150 mm
Reinforcements, y12 at 200 mm centre to centre.
Landing 1200 mm wide.
Steps: Rise = 190 mm
Goings = 230 mm

Assume any other relevant information not given.

(b) To a scale of 1:20, draw a section through a reinforced concrete column at the centre of a basement given the following information. (15 marks)

Information
Basement bed - 150 mm thick
R.C. column - 300 x 300 mm
Loading slab - 200 mm thick
Size of base 1200 mm x 1200 mm
30 mm thick horizontal tanking.
R.C. reinforcement Y16 at 200 mm centre to centre each way.
Main column reinforcement: Y20.
50 mm thick cement/sand goon and cover.

Assume any other relevant information not given.