

2707/303

**BUILDING CONSTRUCTION III  
AND TRANSPORTATION  
ENGINEERING II**

June/July 2018

Time: 3 Hours

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**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**DIPLOMA IN CIVIL ENGINEERING  
MODULE III**

**BUILDING CONSTRUCTION III AND TRANSPORTATION ENGINEERING II**

**3 hours**

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Drawing instruments.*

*This paper consists of EIGHT questions in TWO sections; A and B.*

*Answer FIVE questions, choosing TWO questions from section A, TWO questions from section B and ONE question from either section.*

*All questions carry equal marks.*

*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.**

## SECTION A: BUILDING CONSTRUCTION III

Answer TWO questions from this section.

1. (a) State **four** situations where shoring is required. (4 marks)

(b) With the aid of sketches, describe each of the following:

- (i) raking shore;
- (ii) flying shore.

(12 marks)

(c) State **two**:

- (i) advantages of steel scaffoldings;
- (ii) disadvantages of steel scaffoldings.

(4 marks)

2. (a) State:

(i) **four** advantages of framed structures over the load bearing walls form of construction.

(ii) **three** factors that influence the choice of materials for the construction of framed structures.

(7 marks)

(b) Figure 1 shows the structural section of an office constructed of in-site concrete.

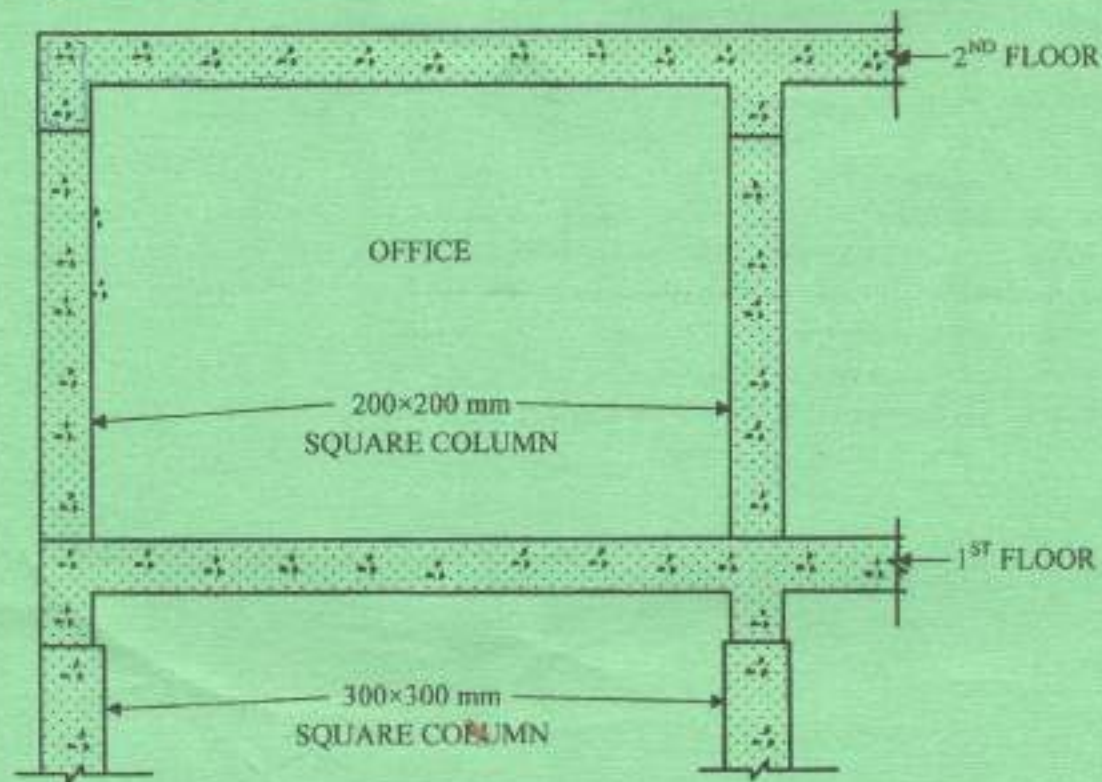


Fig. 1

Sketch the reinforcement details of the first floor at beams, slabs and columns.

(13 marks)

3. (a) Differentiate between pointing and jointing as applied to masonry finishes. (4 marks)
- (b) With the aid of sketches, explain the following types of pointing:
- (i) flush pointing; *H*
  - (ii) keyed pointing. *H* *A semi-circular concave joint that is formed with a steel rod drawn along the joint.* (6 marks)
- (c) (i) State **three** functions of screeding on a concrete floor. (3 marks)
- (ii) Outline the procedure of laying cement screed on the concrete floor surface. (7 marks)

4. **Figure 2** shows a plan of reinforced concrete staircase. To a scale of 1:20, draw section A-A to show all the details including the reinforcements, given the following information:

- I waist = 150 mm
- II riser = 175 mm
- III going = 225 mm
- IV main reinforcement bars 12 mm diameter @ 125 mm c/c
- V other bars: 8 mm diameter @ 200 mm c/c

*1:20  
= 200*

Assume any other necessary information not given.

*9712-01B2  
9712-01B3  
n/18-  
20 marks*

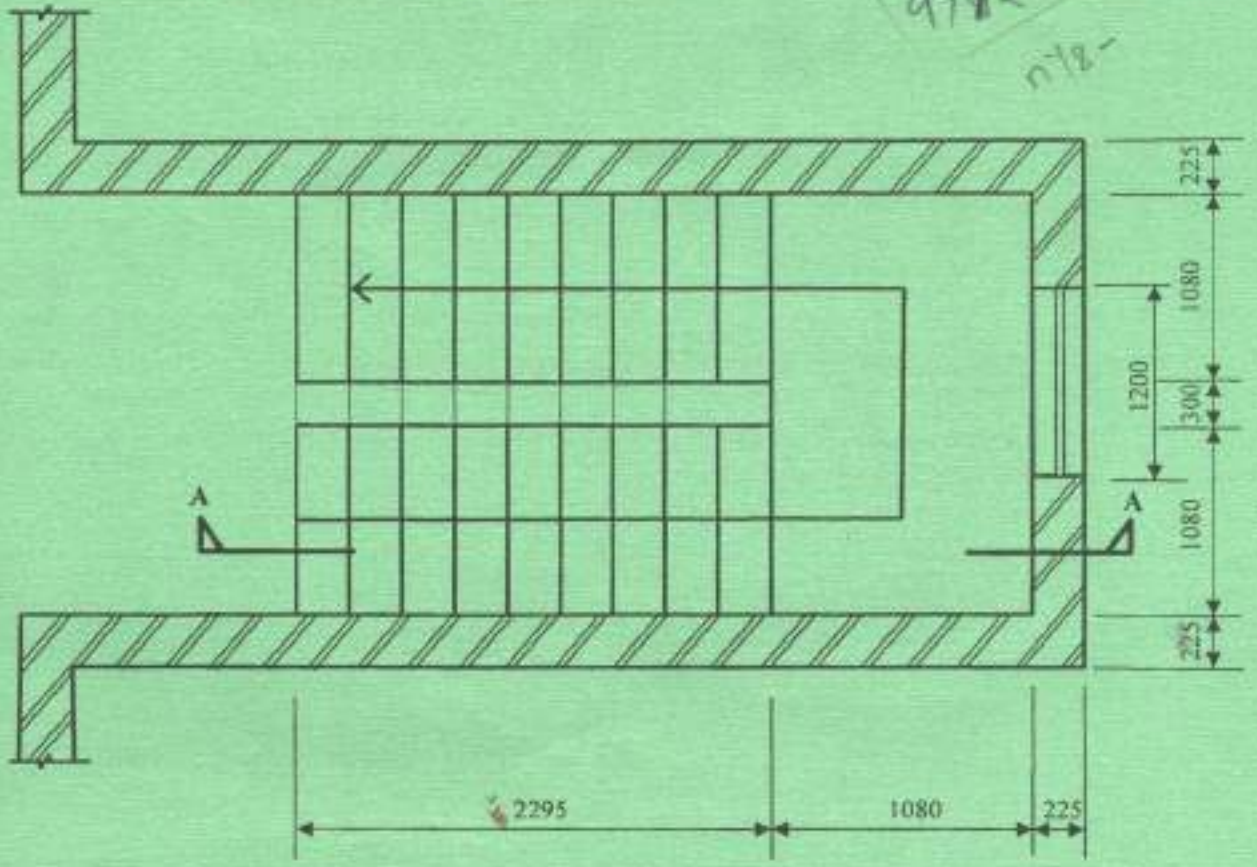


Fig. 2

SECTION B: TRANSPORTATION ENGINEERING II

Answer TWO questions from this section.

5. (a) Define the following terms:
- (i) camber;
  - (ii) centre reserve;
  - (iii) shoulder.
- (6 marks)

- (b) Outline the procedure of setting out a single carriageway width by using offsets from the centre line. (6 marks)

- (c) (i) State four factors to be considered when selecting plants for construction work.   
 - Cost - Type of material.   
 - Availability - Topography. (4 marks)
- (ii) Outline the procedure of cut and fill for earthwork. (4 marks)

6. (a) Explain the characteristic of the following bituminous materials:
- (i) asphaltic concrete;
  - (ii) macadam asphalt.
- (10 marks)

- (b) Describe the following soil laboratory tests:
- (i) sieve analysis;
  - (ii) plastic limit.
- (10 marks)

7. (a) Differentiate between labour intensive and capital intensive. (4 marks)
- Capital intensive - This is the planning of a project in accordance to the capital cost.   
 labour intensive - This is where labour is used on a project & planned in accordance to the labour available.*

- (b) Outline the procedure of sourcing funds for the following labour intensive method for constructing a rural road:
- (i) budget;
  - (ii) community mobilization.
- (10 marks)

- (c) State three:
- (i) merits of labour based work;
  - (ii) demerits of labour based work.
- (6 marks)

*Employment Living Standards*

*lack of skilled labour*

*inefficiency & slow progress*

8. (a) State four economic benefits of a well planned maintenance policy for a road.

- There is routine maintenance after a specified time.
  - Makes it easy to forecast on the budget for maintenance.
  - In case of any defect, it is easily detected.
- (4 marks)
- The road life span is not shortened.

(b) Explain the maintenance assessment needs for a road by the following:

- (i) inspection;
- (ii) records.

(6 marks)

(c) Outline the procedure of carrying out the method of maintaining the following road failures:

- (i) pot-hole repairs for bituminous surface;
- (ii) cracks on cement concrete surface.

(10 marks)

The pit hole is marked with white chalk or paint either a rectangular or square. It is cut into either rectangular or square. The surface is cleaned and sprinkled with water. It is filled with the material ~~best~~ materials and compacted in layers. A Bitumen is added on top of the or on the surface and left to cure for approximately 2 days. The bituminous products that are eliminated from the bitumen are then swept away and surface dressing is done.

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- This mainly happens on the shoulder of the road and should be repaired to prevent drainage of water into the subbase and subgrade of the road.
- The joints at which cracks are detected, the concrete is