2707/205
BUILDING CONSTRUCTION II,
CIVIL CONSTRUCTION AND
TRANSPORT ENGINEERING I
June/July 2018
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN CIVIL ENGINEERING
MODULE II

BUILDING CONSTRUCTION II, CIVIL CONSTRUCTION
AND TRANSPORT ENGINEERING I

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
Answer booklet;
Scientific calculator.
*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**.*
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.

Turn over

SECTION A: BUILDING CONSTRUCTION II

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

1. (a) (i) Describe the term shell roof as used in construction.
(ii) List **two** structures in which shell roofs are used. (4 marks)

(b) With the aid of labelled sketches, distinguish between the following types of roofs:

(i) gambrel roof;
(ii) mansard roof. (6 marks)

(c) With aid of a sketches, describe the following forms of timber trusses:

(i) king post truss;
(ii) queen post truss. (10 marks)

2. (a) **Figure 1** shows the plan of a suspended slab in which a rectangular opening has been provided for ducts.

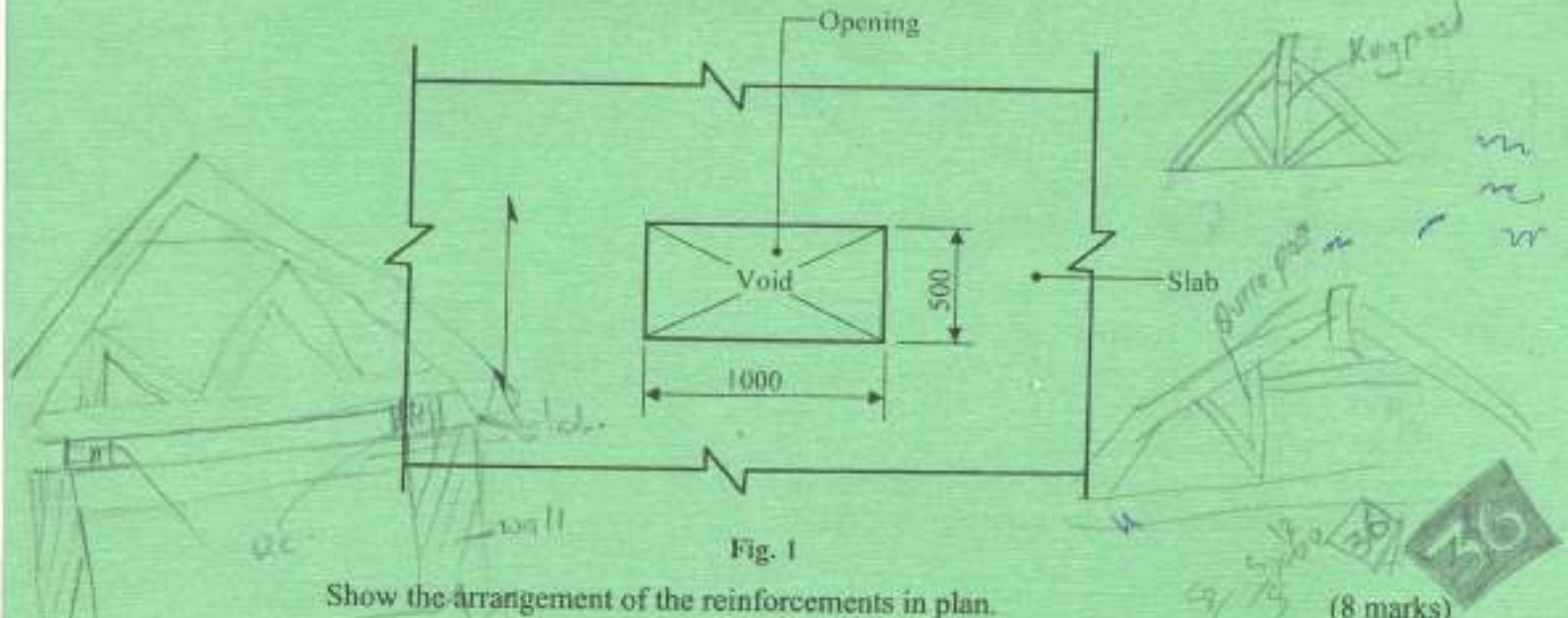


Fig. 1

Show the arrangement of the reinforcements in plan. (8 marks)

(b) Using labelled cross-sectional sketches, describe the following types of timber upper floors:

(i) single;
(ii) double floor. (12 marks)

3. (a) State **five** advantages of steel roof trusses over timber roof trusses. (5 marks)

(b) Outline the procedure of laying galvanized corrugated iron sheets on a rectangular roof panel. (5 marks)

(c) **Figure 2** shows the roof plan of a building.

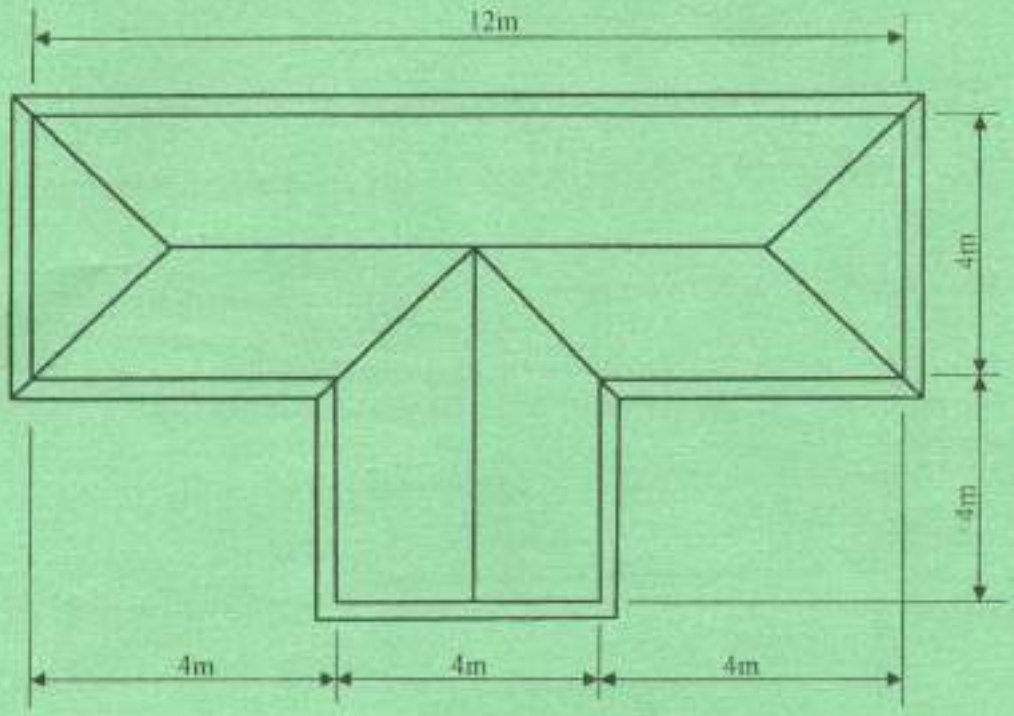


Fig. 2

Estimate the quantity of roof covering materials required given the following data:

Roof pitch	-	30°
Eaves	-	500 mm
G.C.I. Sheet size	-	300 x 1000 mm
End lap	-	150 mm
Side lap	-	150 mm

(10 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION

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

4. (a) State **four** factors that are considered in the design of outdoor swimming pools. (4 marks)

(b) State the function of bulkhead as used in construction. (2 marks)

(c) Explain the function of each of the following marine structures:

(i) moles;
(ii) groin. (4 marks)

(d) (i) Define the term gauge as used in railway.
(ii) State **three** common gauges used in railways.
(iii) Sketch and label a section through a railway line showing the components of a track. (10 marks)

5. (a) Explain the following methods of tunnelling:

(i) cut and cover;
(ii) immersed system. (4 marks)

(b) Distinguish between bored wells and drilled wells. (4 marks)

(c) Sketch and label a section through a typical water well showing its components. (6 marks)

(d) Explain **three** primary causes of failure in embankment dams. (6 marks)

6. (a) (i) Describe a weir as used in discharge structures.
(ii) Using line diagrams, sketch the elevation of two types of wiers. (4 marks)

(b) **Figure 3** shows the plan of an open channel.

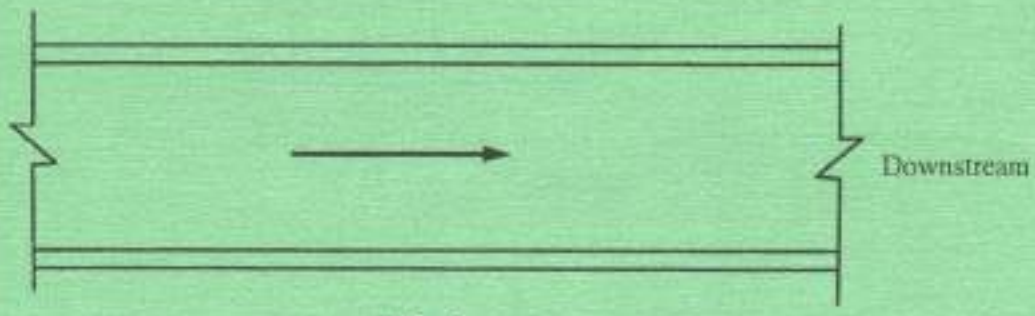


Fig. 3

Using labelled plans, show the use of the following flumes in regulating flow in the channel:

(i) parshall flume;
(ii) cut-throat flume. (6 marks)

(c) Distinguish between the following types of retaining walls:

(i) centilever;
(ii) counterfort. (4 marks)

(d) With the aid of sketches, explain **three** modes of failure that may occur in gravity retaining walls. (6 marks)

SECTION C: TRANSPORT ENGINEERING I

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

7. (a) Outline **three** planning surveys for transportation systems. (6 marks)

(b) With the aid of a sketch, explain the variation of the distabalizing force acting on a vehicle negotiating a compound transition curve. (6 marks)

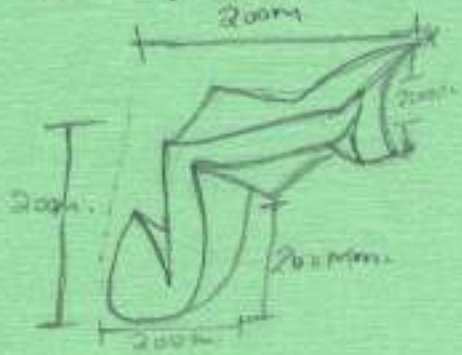
(c) (i) Explain the two speed change lanes in highways and state the one with priority in design and construction.

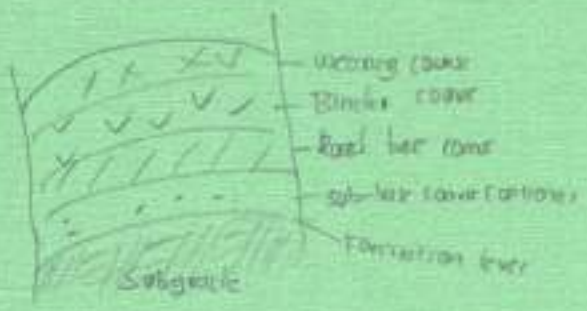
(ii) Using line diagrams, sketch five at grade intersections. (8 marks)

8. (a) Outline **three** modes of transportation in relation to the media surrounding man. (6 marks)

(b) With the aid of sketches, differentiate between **two** types of road pavements. (6 marks)

(c) Explain **four** factors that influence the thickness of a road pavement. (8 marks)





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