

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.

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.

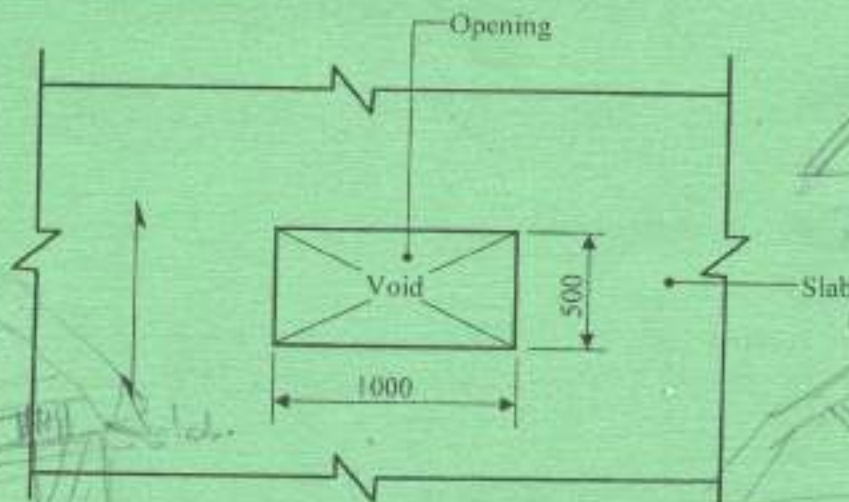


Fig. 1

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)
- are strong
- durable
- can't be affected by termites

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

Muhammad
Sayed
Khalid

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

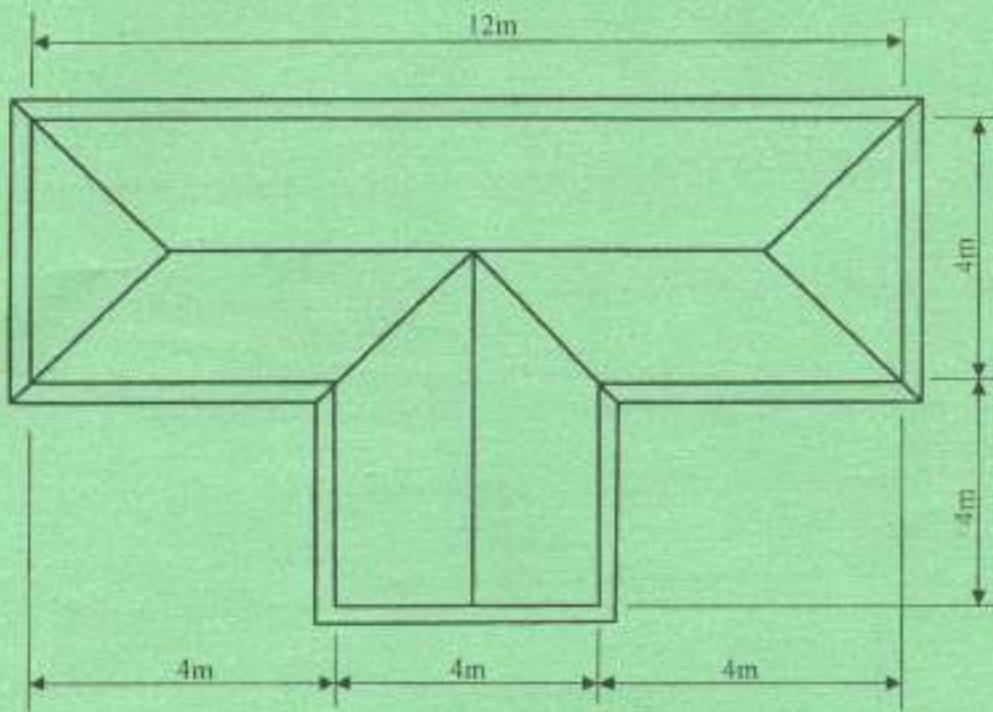


Fig. 2

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

$12 + 4 + 4 + 4 + 4 + 4 + 4 = 40m$

(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 weirs. (4 marks)
- (b) Figure 3 shows the plan of an open channel.

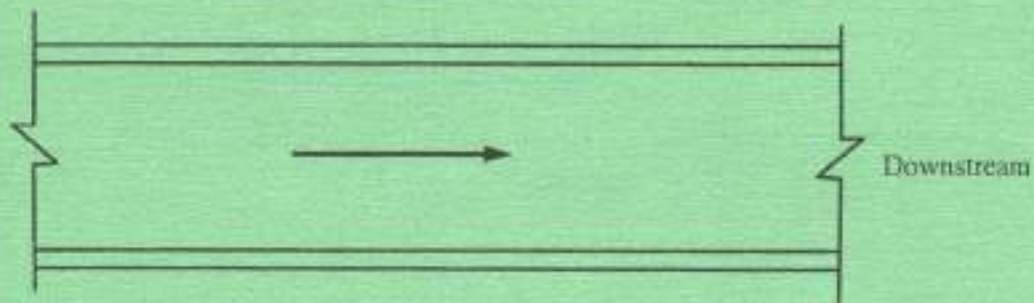
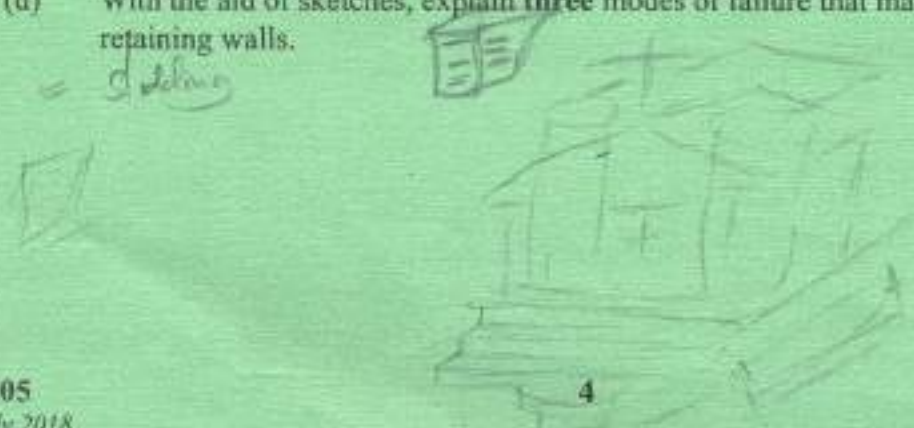


Fig. 3

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

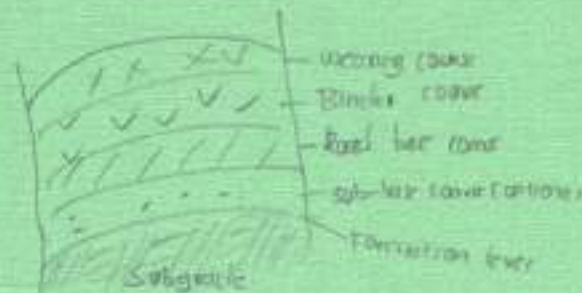
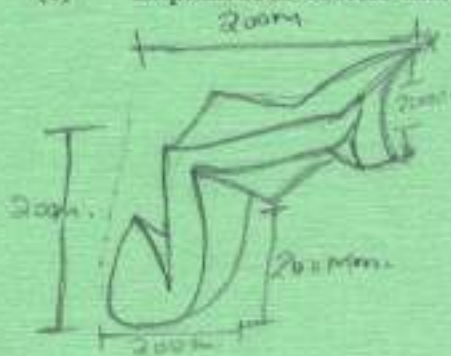
- (i) parshall flume; -
 - (ii) cut-throat flume. - (6 marks)
- (c) Distinguish between the following types of retaining walls:
- (i) cantilever;
 - (ii) counterfort. (4 marks)
- (d) With the aid of sketches, explain three modes of failure that may occur in gravity retaining walls. (6 marks)



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. (8 marks)
- (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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