

2707/205

**BUILDING CONSTRUCTION II, CIVIL
ENGINEERING AND TRANSPORTATION
ENGINEERING I**

June/July 2021

Time: 3 hours

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ADVANCED TECHNOLOGY
P. O. Box 1788, KISUMU



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN CIVIL ENGINEERING

MODULE II

**BUILDING CONSTRUCTION II, CIVIL ENGINEERING AND
TRANSPORTATION 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 4 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) **Figure 1** shows a barrel vault roof with an expansion joint at A. Sketch and label detail A. (5 marks)

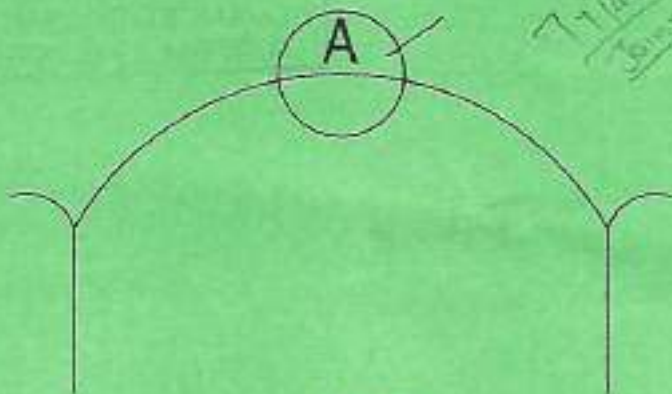


Fig. 1

*77/1203
Joint*
*epoxy galvanized
connector
tooth plate connector*

connector

- (b) Explain **three** design requirements for upper concrete floors. (6 marks)
- (c) Explain each of the following terms as used in roof construction:

- (i) pitch;
 (ii) span; - it is the ^{vertical} horizontal distance between the eadings of the roof.
 (iii) rise. - it is the horizontal distance

- (d) Differentiate between a single and a double roof.

2. (a) With the aid of a labelled sketch, explain the procedure of fixing roof tiles on a pitched roof. (9 marks)

- (b) Illustrate **two** methods of fixing wall plate to a masonry wall. (7 marks)

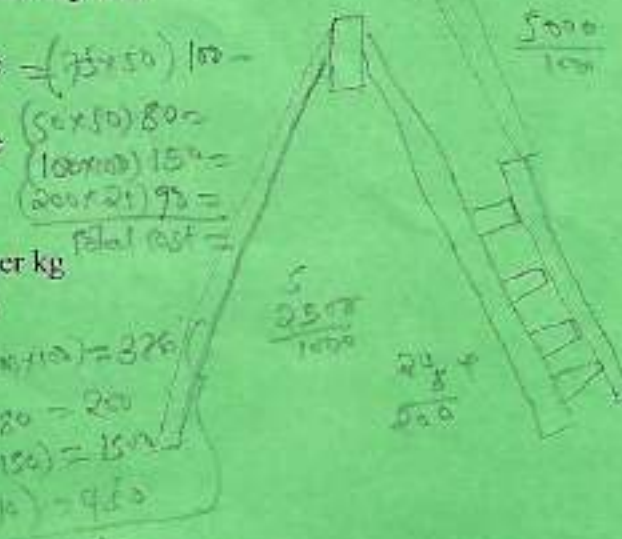
- (c) State **four** advantages of steel roofs over timber roofs. (4 marks)

3. (a) Explain **three** functional requirements of a roof covering. (6 marks)

- (b) **Figure 2** shows a plan of a 'boda boda' flat shed. Determine the cost of constructing the roof structure with its covering using the following data:

Timber: 75 x 50 mm Ksh 100 per metre
 50 x 50 mm Ksh 80 per metre
 100 x 100 mm Ksh 150 per metre
 200 x 25 mm Ksh 90 per metre

Nails: Ordinary nails 8 kg @ Ksh 150 per kg
 Roofing nails 5 kg @ 200 per kg



Waste: 2%
Iron sheets: Ksh 850 per metre
Pitch: 10°

Ignore labour and fascia board.

(14 marks)

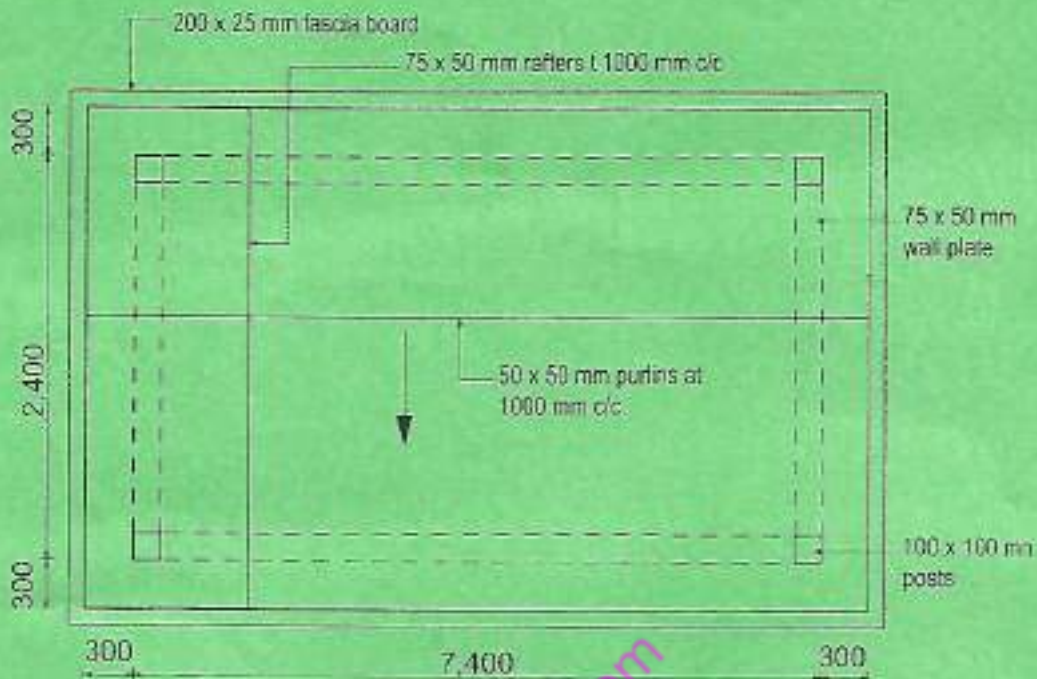


Fig. 2

SECTION B: CIVIL ENGINEERING CONSTRUCTION

Answer **TWO** questions from this section.

4. (a) Explain each of the following terminologies used in wells:

- incrustation;
- aquifer;
- ground water;
- screen.

(8 marks)

(b) State **three** functions of the following parts of a railway track:

- rack;
- fish plate.

(6 marks)

(c) Using sketches, differentiate between straight drop and trough spillways.

(6 marks)

5. (a) Explain **three** obstacles in tunnelling.

→ joint
→ fault
→ water table

(6 marks)

(b) State **two** functional requirements of foundations.

→ Heavy to carry heavy load

(2 marks)

- (c) With the aid of sketches, explain each of the following water front structures:
- (i) sea walls;
 - (ii) jetties.
- (12 marks)

6. (a) Sketch and label each of the following types of foundations stating where each is used:
- (i) deep strip;
 - (ii) raft.
- (12 marks)

- (b) State **four** stability requirements of a retaining wall. ✓ ← overdu (4 marks)

- (c) State **four** defects in swimming pools. (4 marks)

SECTION C: TRANSPORTATION ENGINEERING I

Answer ONE question from this section.

7. (a) Describe the following surveys for transportation systems:
- (i) reconnaissance survey;
 - (ii) preliminary survey.
- (6 marks)

- (b) Differentiate the following terms as used in highway engineering:
- (i) longitudinal profile and cross-section;
 - (ii) camber and crown;
 - (iii) cross fall and super elevation.
- (6 marks)

- (c) (i) State **four** requirements of road intersections.
(ii) With the aid of sketches, differentiate between staggered and skewed-staggered junctions.
- (8 marks)

8. (a) Outline **four** types of current roads. (6 marks)

- (b) Explain the function of each of the components of a flexible pavement. (8 marks)

- (c) With the aid of a diagram, describe the variation of stress distribution with depth in a road pavement. (6 marks)

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