

2707/303

**BUILDING CONSTRUCTION III AND
TRANSPORT ENGINEERING II**

June/July 2021

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN CIVIL ENGINEERING

MODULE II

**BUILDING CONSTRUCTION III AND
TRANSPORT ENGINEERING II**

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Scientific calculator.

The paper consists of EIGHT questions in THREE sections; A, B and C.

Answer any FIVE questions; choosing at least TWO questions from each section.

All questions carry equal marks.

Maximum marks for each part of a question are as 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 at least **TWO** questions from this section.

1. (a) State **four** types of materials used for making framed construction. (2 marks)
- (b) With the aid of sketches, differentiate between castella and litzka beams. (6 marks)
- (c) With the aid of sketches, describe a **four** hour fire protection to steel universal columns using:
- (i) solid protection;
 - (ii) hollow protection. (6 marks)
- (d) Sketch the details at A, B and C for the precast concrete portal frames shown in **figure 1**.

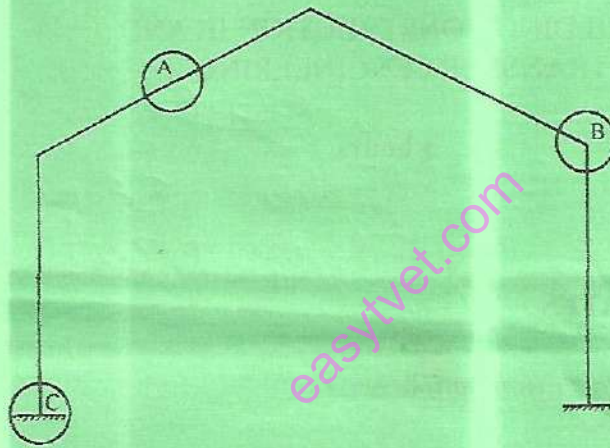


Fig. 1

2. (a) (i) Define the term formwork. (4 marks)
- (ii) State **three** functional requirements of formwork. (4 marks)
- (b) State **two** functions of a kicker in formwork. (2 marks)
- (c) With the aid of sketches, describe the following types of scaffolds:
- (i) gantry; 8 public
 - (ii) putlog. (8 marks)

- (d) **Figure 2** shows a double matchboarded door. Sketch section X-X to show the following details:

- (i) match boarding and hanging stile;
(ii) meeting stile.

(6 marks)

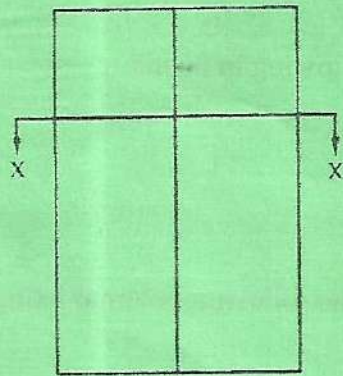


Fig. 2

3. (a) Define the following terms as used in timber stairs:

- (i) riser;
(ii) rise;
(iii) step;
(iv) tread.

- (b) Describe the following open tread type of stairs:

- (i) closed string;
(ii) mono carriage.

(4 marks)

- (c) With the aid of sketches, describe the following:

- (i) double flying shores;
(ii) jack and pile underpinning.

(12 marks)

4. (a) Describe the following types of floor finishes:

- (i) carpet;
(ii) pitch mastic.

(4 marks)

(b) Describe the following types of rendering:

- (i) rough cast;
- (ii) pebble dash;
- (iii) spattered finish.

(6 marks)

(c) State the function of each of the following in paints:

- (i) medium;
- (ii) pigment.

(2 marks)

(d) With the aid of sketches, describe the following internal fixings:

- (i) skirting;
- (ii) dado rails;
- (iii) architraves;
- (iv) cornice.

(8 marks)

SECTION B: TRANSPORT ENGINEERING II

Answer at least TWO questions from this section.

5. (a) Define a railway sleeper and state four requirements of good sleepers. (5 marks)

(b) With the aid of sketches, describe:

- (i) a chair for a bull head rail;
- (ii) fish plate connection.

(11 marks)

(c) Explain the maintenance of points and crossings in railway track. (4 marks)

6. (a) Define the term dredging and state four reasons for dredging. (5 marks)

(b) With the aid of sketches, describe the following types of dredging plants:

- (i) trailer-suction dredger;
- (ii) bucket ladder dredger.

(9 marks)

(c) Describe three categories of road markers and state one example for each case.

(6 marks)

V9010

- 7.
- (a) State **four** properties of a good base ballast (aggregate). (2 marks)
- (b) Explain **three** functions of road drainage. (3 marks)
- (c) State **two** reasons for each of the following types of failure in roads:
- (i) rut and depression;
 - (ii) bleeding in pavements;
 - (iii) alligator cracks.
- 16 (6 marks)
- (d) Describe the preparation of formation level in road construction. (4 marks)
- (e) Sketch a section through a kerb to an adjoining pavement and state **two** functions of a kerb. (5 marks)
- 8.
- (a) State **four** functional requirements of reinforcement in rigid pavements. (4 marks)
- (b) Describe **four** functional requirements of joints in rigid pavements. (4 marks)
- (c) Explain the following types of failures in rigid pavements:
- (i) scaling of concrete;
 - (ii) mud pumping phenomenon;
 - (iii) structural cracks.
- (6 marks)
- (d) Describe the following methods of laying rigid pavement:
- (i) cement gravel method;
 - (ii) rolled concrete method.
- (6 marks)

THIS IS THE LAST PRINTED PAGE.