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2707/205
BUILDING CONSTRUCTION II,
CIVIL ENGINEERING CONSTRUCTION AND
TRANSPORT ENGINEERING I
Oct./Nov. 2018
Time: 3 hours

JAN 2019

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN CIVIL ENGINEERING

MODULE II

BUILDING CONSTRUCTION II, CIVIL ENGINEERING CONSTRUCTION AND TRANSPORT ENGINEERING I

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
- *Answer booklet;*
- *Drawing instruments;*
- *Mathematical tables/scientific calculator.*

*The paper consists of **EIGHT** questions in **THREE** sections; **A, B** and **C**.*
*Answer any **FIVE** questions; choosing **THREE** questions from section **A**, **ONE** question from section **B** and **ONE** question from section **C** in the answer booklet.*
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.

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SECTION A: BUILDING CONSTRUCTION II

*Answer **THREE** questions from this section.*

1. (a) Explain **three** advantages of upper timber floors. (6 marks)

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

   (c) With the aid of a labelled sketch, explain the following terms as applied to roofs:

   (i) overall span;
   (ii) rise;
   (iii) pitch.

   (8 marks)

2. (a) Sketch the following timber joints used in wall plate:

   (i) longitudinal halved joint;
   (ii) angle halved joint;
   (iii) tee halved joined.

   (6 marks)

   (b) **Figure 1** shows the plan and section of a 'bodaboda' roof shed. Estimate the cost of roofing the shed using purpose made iron sheets given the following data: (14 marks)

   Cost of 3 m long gauge 30 iron sheets @ Ksh 1500
   Cost of 100 mm x 75 mm timber boards @ Ksh 100 per metre
   Cost of 75 mm x 50 mm timber boards @ Ksh 90 per metre
   Cost of M.S roofing nails 1 kg @ Ksh 150
   Cost of ordinary nails 1 kg @ Ksh 100

   Assume any other necessary information.

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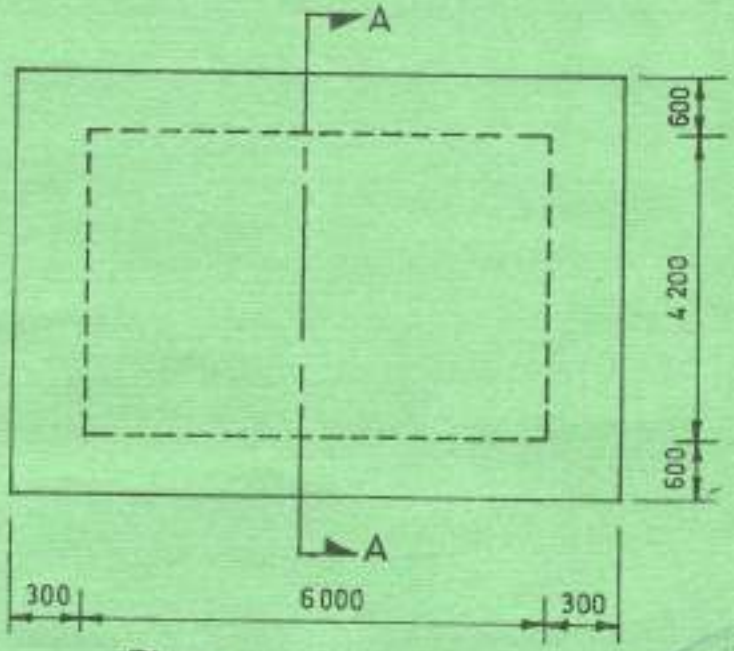
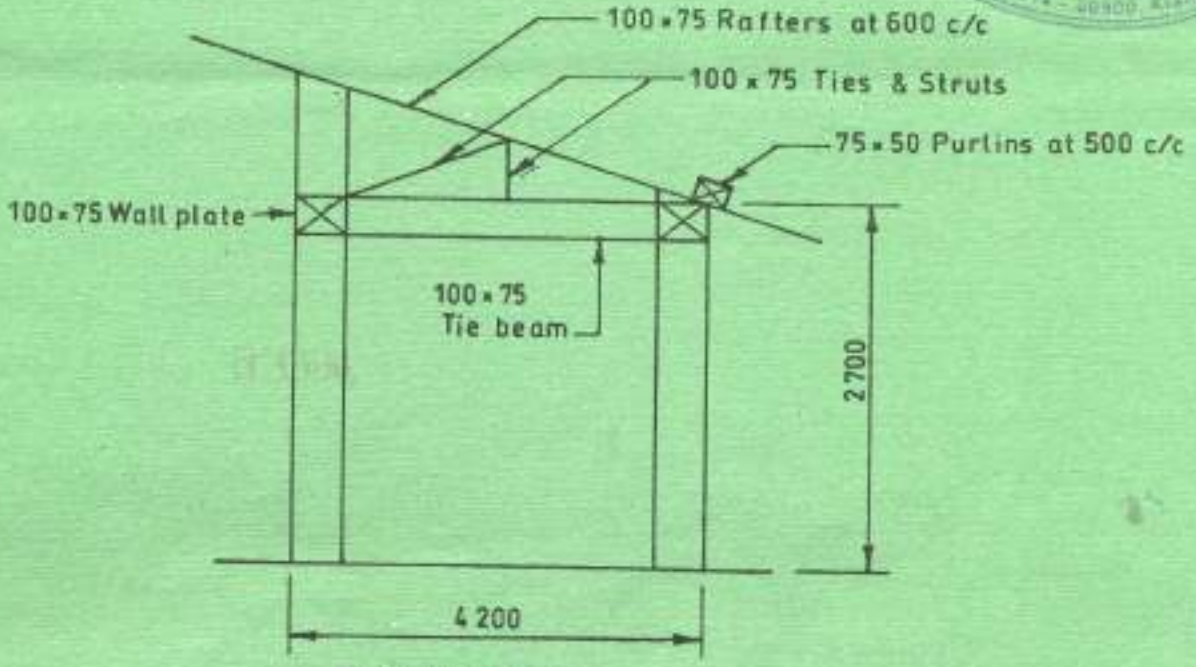


Plan



Section A-A

Fig. 1

3. (a) State **four** merits of steel trusses over timber trusses. (4 marks)

(b) Outline the procedures for constructing a solid concrete upper floor under the following headings:

(i) erection of formwork;
(ii) casting of concrete.

(10 marks)

(c) Sketch and label the following types of roof trusses:

(i) compound howe truss;
(ii) queen post truss.

(6 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION

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

4. (a) State **four** causes of failure in dams. (4 marks)

(b) Explain the term retaining wall as used in dams. (2 marks)

(c) With the aid of a labelled sketch, explain the action of the following pressures on a retaining wall:

(i) active pressure;
(ii) passive pressure;
(iii) ground bearing pressure. (6 marks)

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(d) Explain **four** functions of foundations. (8 marks)

5. (a) State **three** reasons for tunnelling. (3 marks)

(b) Outline **three** advantages of concrete dams over earth dams. (3 marks)

(c) With the aid of a labelled sketch, describe a shallow well in unstable grounds. (7 marks)

(d) (i) State **two** effects of dampness on underground structures.

(ii) Sketch and label a section through a concrete basement showing details of external tanking. (7 marks)

6. (a) (i) Explain the term dolphin as used in water front structures.

(ii) Describe **two** types of dolphins.

(6 marks)

(b) Sketch and label the following discharge regulating structures:

(i) side channel spillway;
(ii) trough spillway;
(iii) drum gate spillway.

(9 marks)

(c) Sketch and label a longitudinal section through a bearing plate in a railway line.

(5 marks)

SECTION C: TRANSPORT ENGINEERING I

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

7. (a) Outline **four** sources of information for a site investigation. (6 marks)

(b) With the aid of a labelled sketch, explain the setting out procedure for a circular curve using offsets from the long chord. (6 marks)

(c) Differentiate between passing and meeting sight distances. (2 marks)

(d) Explain **three** factors that justify the provision of grade separated intersections.

(6 marks)

8. (a) Sketch and label a section through a rigid pavement. (3 marks)

(b) (i) With the aid of a sketch, explain the variation of stress with the depth on a road pavement.

(ii) Explain the disparity in stability requirements in the layers of a flexible pavement relative to (i) above. (8 marks)

(c) Describe the Kenyan rural road design procedure using the relevant manual.

(9 marks)

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