

2306/303

**BUILDING CONSTRUCTION, CIVIL
ENGINEERING CONSTRUCTION AND
DRAWING**

Oct./Nov. 2022

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN QUANTITY SURVEYING

BUILDING CONSTRUCTION, CIVIL ENGINEERING CONSTRUCTION AND DRAWING

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Drawing instruments;

Drawing paper size A3.

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

*Answer **FIVE** questions; **TWO** questions from section **A**, **TWO** questions from section **B** and **ONE** question from section **C**.*

*Questions in section **A** and **B** are **15** marks each while questions in section **C** are **40** marks each.*

Maximum marks for each part of a question are as indicated.

Candidates should answer the questions in English.

This paper consists of 8 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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Turn over

SECTION A: BUILDING CONSTRUCTION

Answer *TWO* questions from this section.

1. (a) Explain each of the following systems of domestic waste water disposal:
- (i) single stack;
 - (ii) two pipe;
 - (iii) one pipe.
- (6 marks)
- (b) (i) Explain the term 'suspended ceiling'.
- (ii) State **four** types of suspended ceilings.
- (4 marks)
- (c) **Figure 1** shows a concrete portal frame. Sketch and label detail A.
- (5 marks)

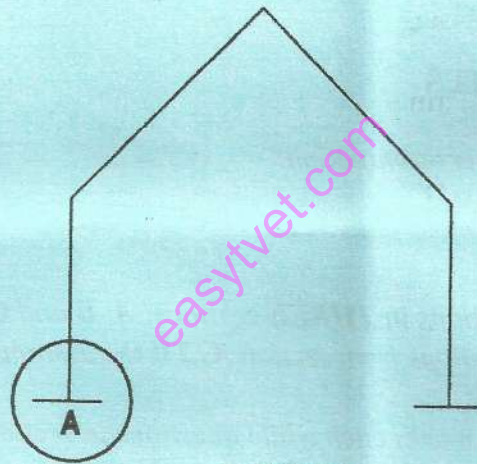


FIGURE 1

2. (a) Differentiate between the terms 'thermal resistivity' and 'thermal conductivity' in building. (3 marks)
- (b) Explain **three** reasons for building maintenance. (6 marks)
- (c) Sketch and label a cross-section through a lantern light of a pitched roof. (6 marks)
3. (a) State **six** types of fences. (3 marks)
- (b) Differentiate between 'non self centering' and 'partially centering' floors. (3 marks)
- (c) With the aid of a labelled pictorial sketch, explain the construction of a cranked slab stair. (9 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION

Answer TWO questions from this section.

4. (a) Explain **three** methods of permanent water exclusion in foundations. (6 marks)
- (b) Explain the difference between remote and sock grout seals in caisson construction. (4 marks)
- (c) Sketch and label a section through a railway line. (5 marks)
5. (a) Explain each of the following terms used in airports:
- (i) taxiway;
- (ii) runway excursion;
- (iii) runway incursion. (6 marks)
- (b) Explain **three** factors considered before designing a pedestrian bridge. (6 marks)
- (c) (i) Define the term spillway.
- (ii) State **three** types of spillways. (3 marks)
6. (a) State **four** types of wells. (2 marks)
- (b) Explain the term tunnel as used in Civil Engineering. (2 marks)
- (c) Explain:
- (i) the term “waste water treatment”;
- (ii) **two** reasons for waste water treatment. (6 marks)
- (d) Sketch and label a section through a diaphragm wall. (5 marks)

SECTION C: DRAWING

Answer *ONE* question from this section.

7. **Figure 2** shows the plan of a highway and a bridge.

To a scale of 1:50 draw section X-X using the data provided:

Data

- | | |
|----------------------------------|--|
| - Footpath gravel | 300 mm thick |
| - Asphalt surfacing on footpath | 25 mm thick |
| - Asphalt premix surfacing | 50 mm thick |
| - Sub-base maximum depth | 1000 mm |
| - Base course depth | 500 mm |
| - Road kerb | 250 x 800 mm |
| - Flush channel | 250 x 700 mm |
| - Column base | 3000 x 3000 x 1000 mm |
| - Murram blinding | 3000 x 3000 x 200 mm |
| - Trapezoidal drainage channel | 1500 mm wide at the top and 500 mm at the bottom |
| - Height of the drainage channel | 1100 mm |
| - Total column height | 12000 mm |
| - Substructure column height | 5200 mm |
| - Rails | 200 x 200 mm |
| - Deck slab thickness | 500 mm |

Assume any other necessary information.

(40 marks)

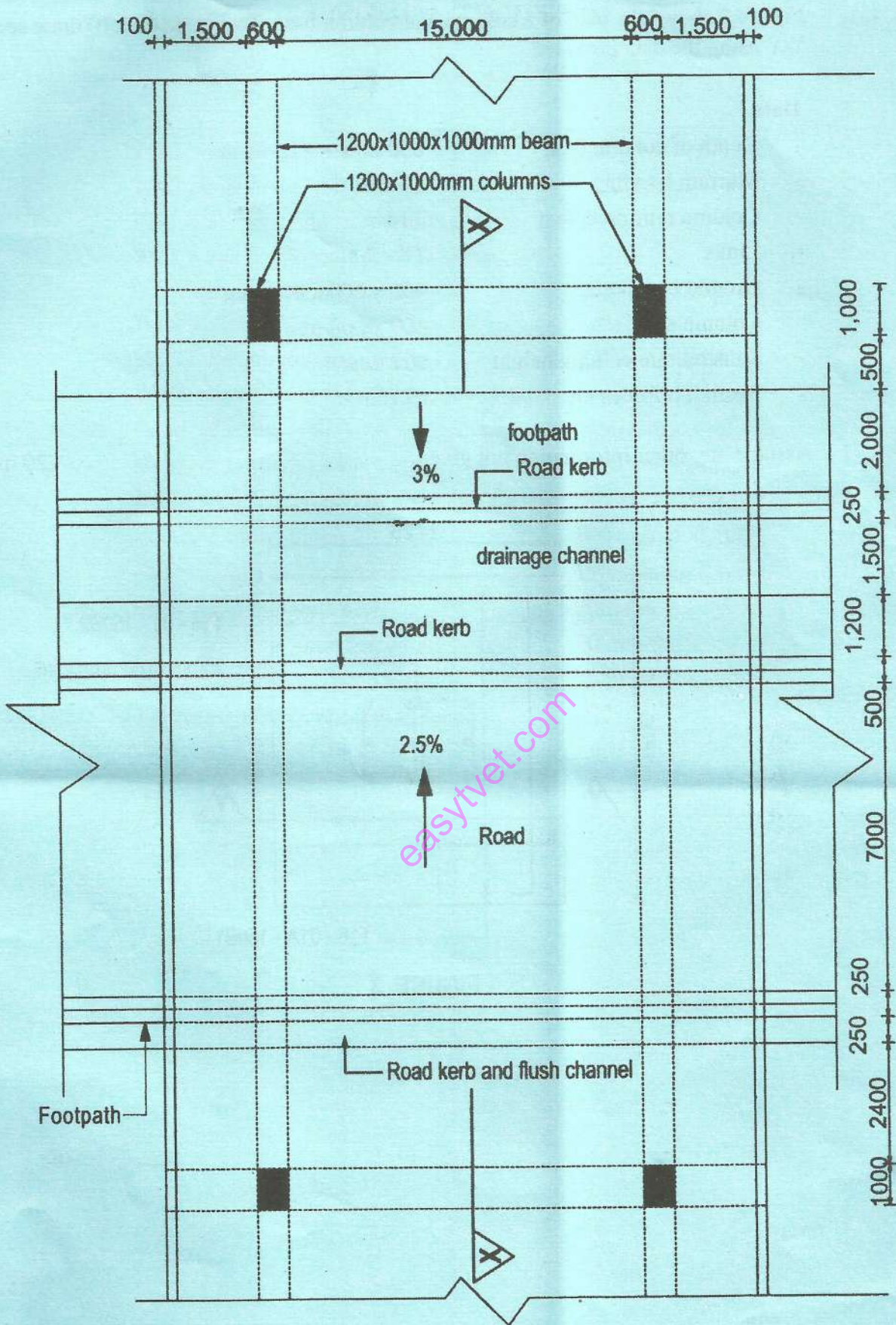


FIGURE 2

8. (a) **Figure 3** shows the plan of a column and column base. To a scale of 1:10 draw section Y-Y using the data provided.

Data

- Depth of column base 600 mm
- Murram blinding 50 mm
- Column reinforcement T16
- Links T8 - 200
- Ground beams size 400 x 600 x 400 mm
- Column size 400 x 600 mm
- Substructure column height 800 mm
- Beam reinforcement 6T16

Assume any other information not given.

(20 marks)

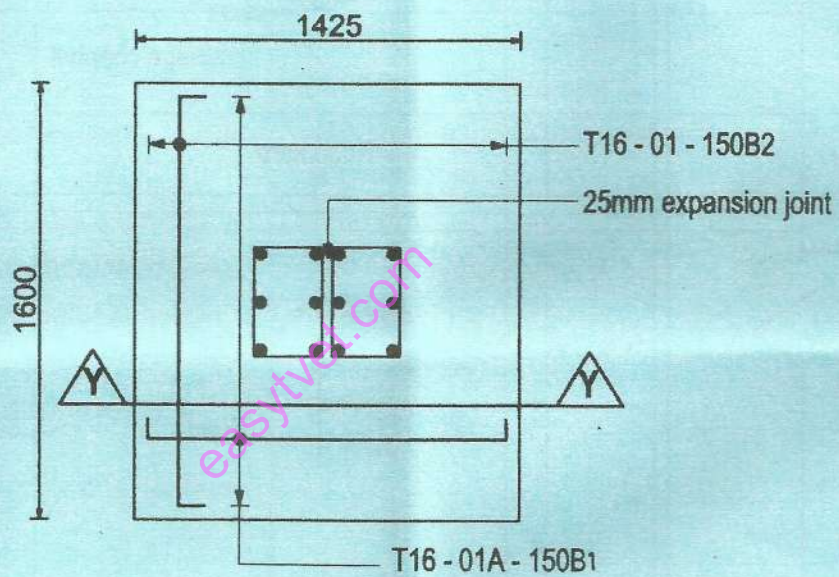
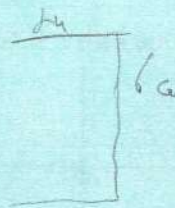


FIGURE 3



- (b) **Figure 4** shows the plan of a septic tank. To a scale of 1:25 draw section Z-Z using the data provided.

Data

- Total pit depth at wall	X-2750 mm
- Total pit depth at wall	Y-2150 mm
- Wall X at a gradient from baffle wall B	
- Wall Y and baffle wall B at the same base level	
- Total pit depth for manhole	900 mm
- MDCI cover and frame	600 x 450 mm
- Sewage level from top of base slab of wall	X-1700 mm
- Depth of baffle wall A	1250 mm
- Depth of baffle wall B	1000 mm
- Baffle wall A projects 250 mm above sewage level	
- Inlet and outlet pipes	100 mm ϕ UPVC
- Concrete bed in septic tank	150 mm thick
- Suspended slab thickness	200 mm
- Water proofing screed on concrete bed	20 mm thick
- Plaster / render	15 mm thick
- Thickness of concrete bed in manholes	100 mm

Assume any other necessary information.

(20 marks)

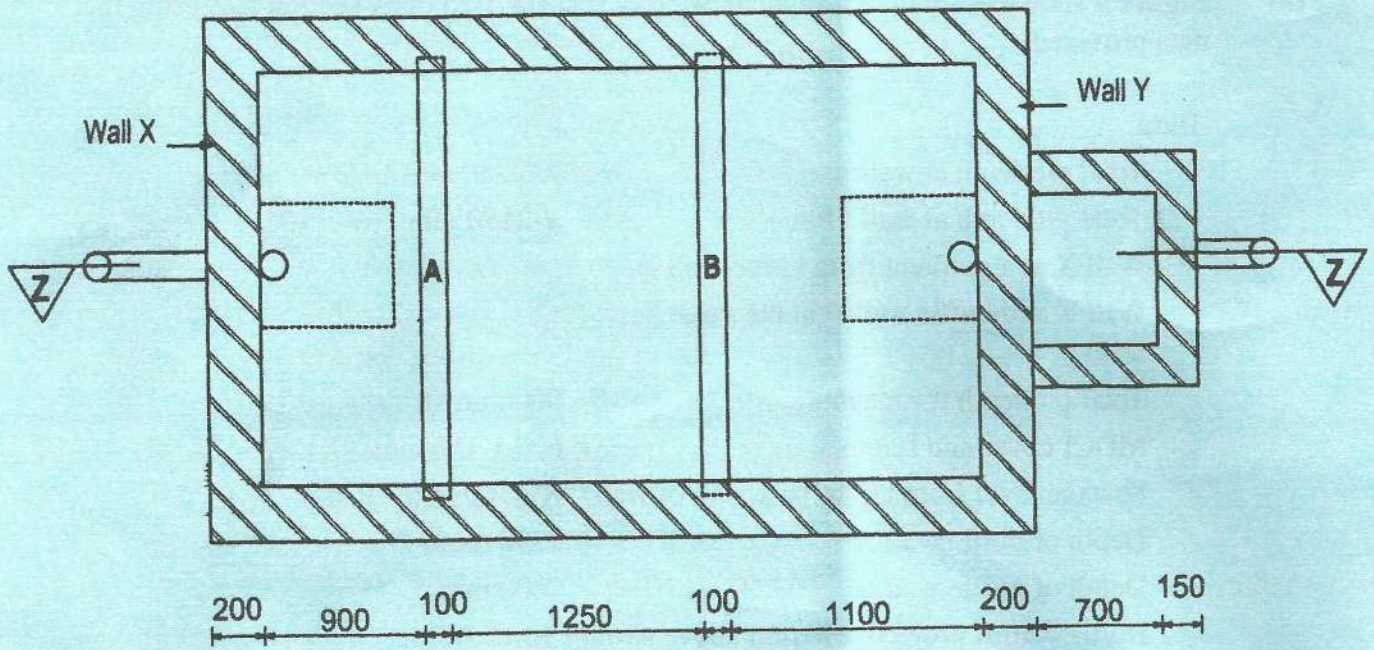


FIGURE 4

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