

2306/303

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

Oct. / Nov. 2021

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 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

Answer **TWO** questions from this section.

1. (a) With the aid of a labelled sketch, explain a dead shore. (6 marks)
- (b) State **four** functional requirements of a wall. (2 marks)
- (c) Define the term 'substructure' as used in construction. (2 marks)
- (d) With the aid of a labelled sketch, explain a short bored pile foundation. (5 marks)
2. (a) (i) Differentiate between active and passive earth pressure. (4 marks)
- (ii) With the aid of a labelled sketch, explain a crib retaining wall. (6 marks)
- (b) With the aid of a labelled sketch, explain a piled basement. (5 marks)
3. (a) With the aid of a labelled sketch, explain a root pile. (6 marks)
- (b) State **three** effects of water in the subsoil. (3 marks)
- (c) With the aid of a labelled sketch, explain the construction details of a parapet cavity wall. (6 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION.

Answer **TWO** questions from this section.

4. (a) Sketch and label a monolithic caisson. (3 marks)
- (b) Sketch and label each of the following rail truck junctions:
 - (i) tandem turnouts;
 - (ii) diamond crossing.(8 marks)
- (c) Explain **two** methods of de-watering a foundation. (4 marks)
5. (a) Explain the **three** forms of effluent. (6 marks)
- (b) Sketch and label the direct cold water supply system. (6 marks)
- (c) Outline the **two** categories of dredging. (3 marks)

6. (a) Sketch and label a longitudinal section of a ring culvert. (4 marks)
- (b) Explain the **four** types of macadam roads. (8 marks)
- (c) Highlight **three** types of water front structures. (3 marks)

SECTION C: DRAWING

Answer ONE question from this section.

7. (a) To a scale of 1:20, draw a section through a half turn staircase, using the data provided. (20 marks)
- (i) Going 250 mm
 - (ii) Rise 150 mm
 - (iii) Headroom 2850 mm
 - (iv) Floor slab thickness 150 mm
 - (v) Waist thickness 150 mm
 - (vi) Wall thickness 200 mm
 - (vii) Landing length 1000 mm
 - (viii) Main and distribution bars T12@ 200 mm c/c
 - (ix) Bearing on wall 150 mm

Assume any other necessary data not provided.

- (b) **Figure 1** shows a plan of an underground water chamber, to a scale of 1:20, draw section A - A using the data provided. (20 marks)

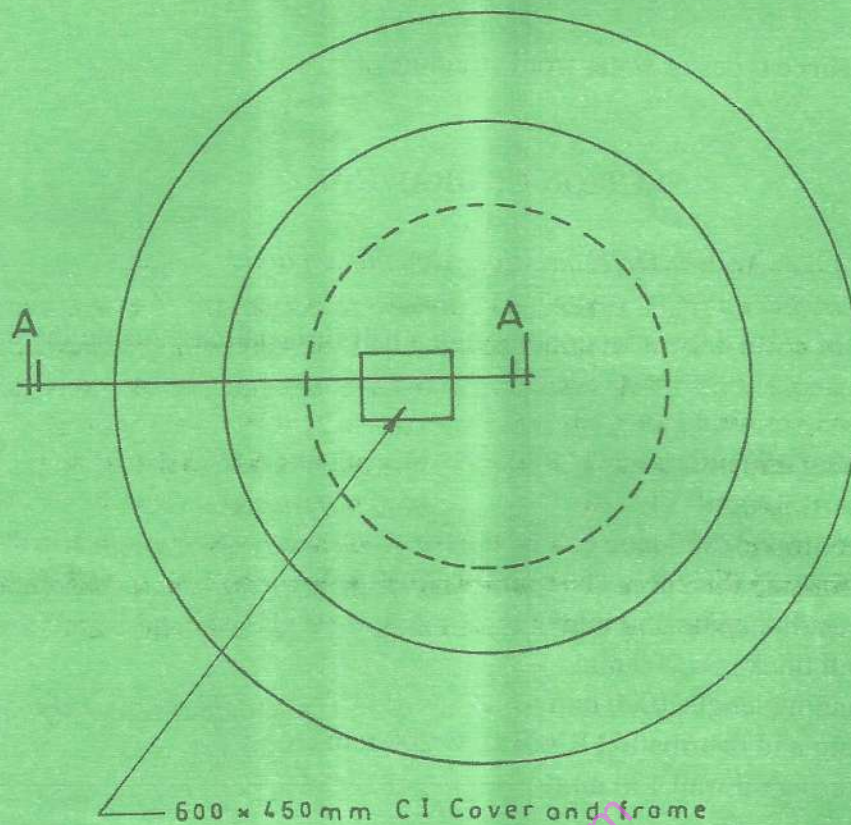


Fig.1

- (i) Foundation concrete 900 mm x 300 mm thick
- (ii) Foundation floor slab thickness 100 mm thick
- (iii) 20 mm asphalt tanking
- (iv) B.R.C fabric reinforcement No. A 142
- (v) 250 mm thick concrete (1:2:4) bed
- (vi) 25 mm thick waterproof paving screed (1:4)
- (vii) 100 mm thick solid concrete block wall
- (viii) 215 mm thick concrete (1:2:4) wall
- (ix) 15 mm thick water proof plaster
- (x) Datum of ground level 50.00 m and invert level 46.90 m
- (xi) Height from ground level to top of concrete cover 375 mm
- (xii) Thickness of concrete cover slab 150 mm
- (xiii) Cover slab project 150 mm from face of block wall
- (xiv) 20 mm thick bituminous felt D.P.C
- (xv) Internal diameter of tank 3000 m

Assume any other necessary information not provided.

8. (a) To a scale of 1:25, draw a road cross-section using the data provided. (25 marks)

- (i) Road width 2000 mm from the centre line
- (ii) Foot path width 1500 mm
- (iii) 300 mm thick road - sub - base
- (iv) 250 mm thick road base
- (v) 60 mm thick road base course
- (vi) 40 mm thick wearing course
- (vii) 500 x 500 x 50 mm cover grate
- (viii) Rectangular drain of width 500 mm
- (ix) Depth of drain is 400 mm below the bed of kerb stone
- (x) Kerbstone bed 250 mm width x 100 mm thick
- (xi) Concrete haunching 100 mm thick
- (xii) 200 mm thick hardcore filling to foot path
- (xiii) 40 mm thick dust blinding to hardcore
- (xiv) 600 x 600 x 50 mm P.C.C slab
- (xv) Crossfall both to footpath and road is 3%
- (xvi) Drain pipe diameter 300 mm laid on 100 mm concrete base of the drain
- (xvii) P.C.C slab laid in line with the outer kerb bevel.
- (xviii) P.C.C slab laid flush with the inner kerb
- (xix) 600 x 125 x 254 mm high kerb stone
- (xx) 50 mm thick P.C.C slab laid to surround the side drain
- (xxi) 50 mm thick concrete blinding to side drain.

Assume any other necessary information not provided.

(b) To a scale of 1:10, draw a cross-section through a manhole, using the data provided. (15 marks)

- (i) manhole internal width 800 mm
- (ii) concrete bed 150 mm thick
- (iii) concrete block wall 200 mm thick
- (iv) drain pipe 150 mm diameter
- (v) concrete benching 45°
- (vi) plaster 12 mm thick
- (vii) depth of manhole from bed 650 mm
- (viii) C.I manhole cover 450 x 450 mm
- (ix) precast concrete top slab 100 mm thick

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