

2306/303

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

Oct./Nov. 2011

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 A₂.

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

*Answer **FIVE** questions choosing **TWO** questions from sections A and B and **ONE** question from section C.*

Questions in section A and B carry 15 marks each while those in section C carry 40 marks each.

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

This paper consists of 8 printed pages.

Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A: BUILDING CONSTRUCTION

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

1. (a) With regard to thermal insulation of a building:
- Differentiate between thermal conductivity and thermal resistivity.
 - State **four** factors considered when specifying thermal insulation materials. (6 marks)
- (b) **Figure 1** shows the plan of a wall whose foundation is to be strengthened by brick underpinning.
- List **two** factors to be considered when deciding on the number and length of bays.
 - Sketch and label a typical:
 - underpinning schedule for the wall;
 - section through a brick underpinning.(9 marks)

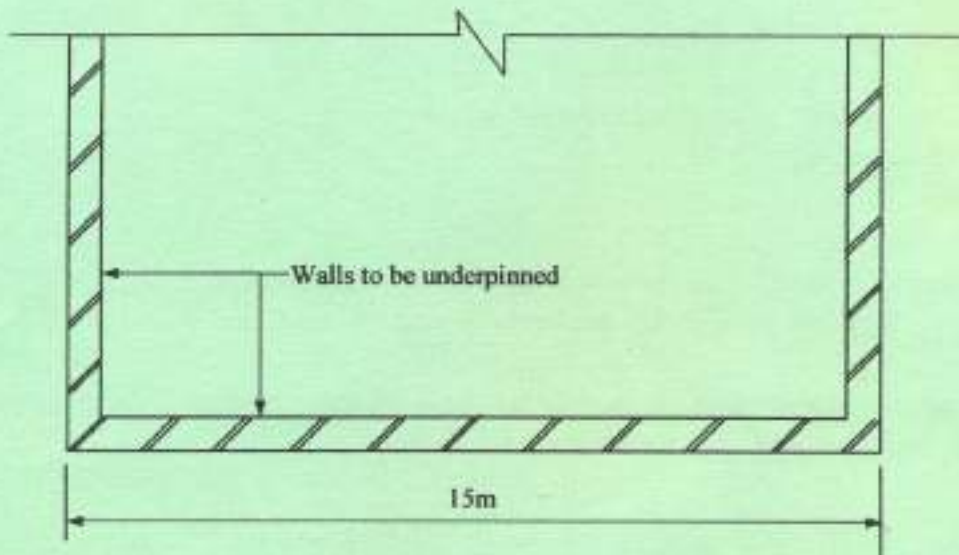
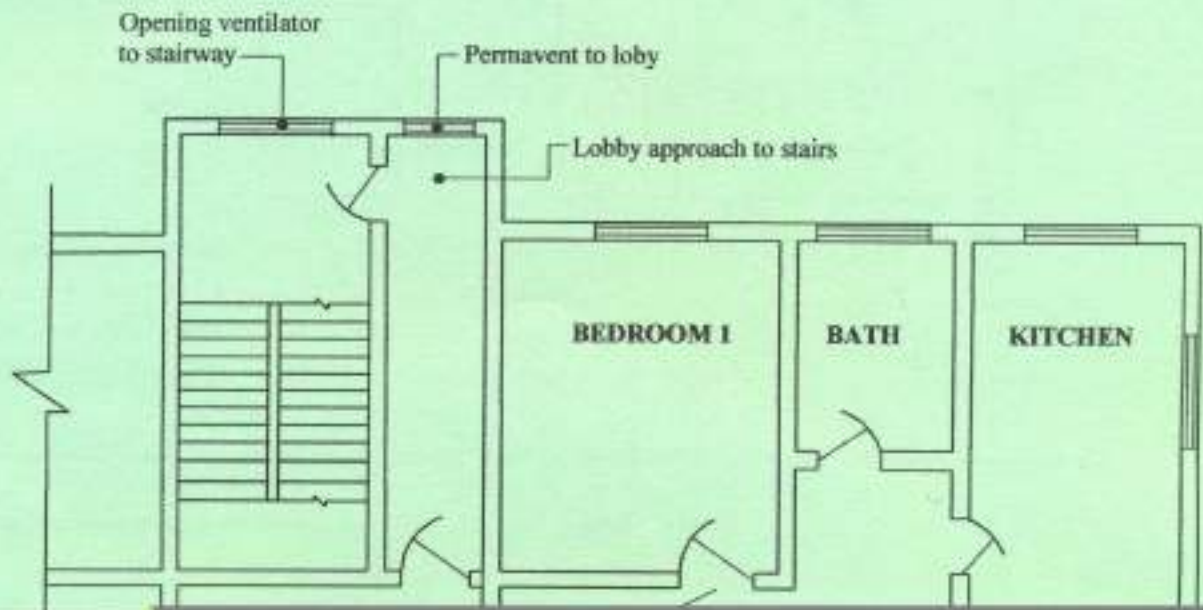


Figure 1

2. (a) State **four** functional requirements of claddings. (4 marks)
- (b) Figure 2 shows a typical floor plan for a flat designed to provide means of fire escape.
- (i) State **four** basic means of escape requirements for flats;
- (ii) Sketch and label a typical half-hour fire check timber door and frame. (11 marks)



3. (a) (i) State **four** principles of good drainage;
- (ii) Briefly describe separate system of underground drainage;
- (iii) Use the set-up shown in **Figure 3** to illustrate separate drainage system. (9 marks)

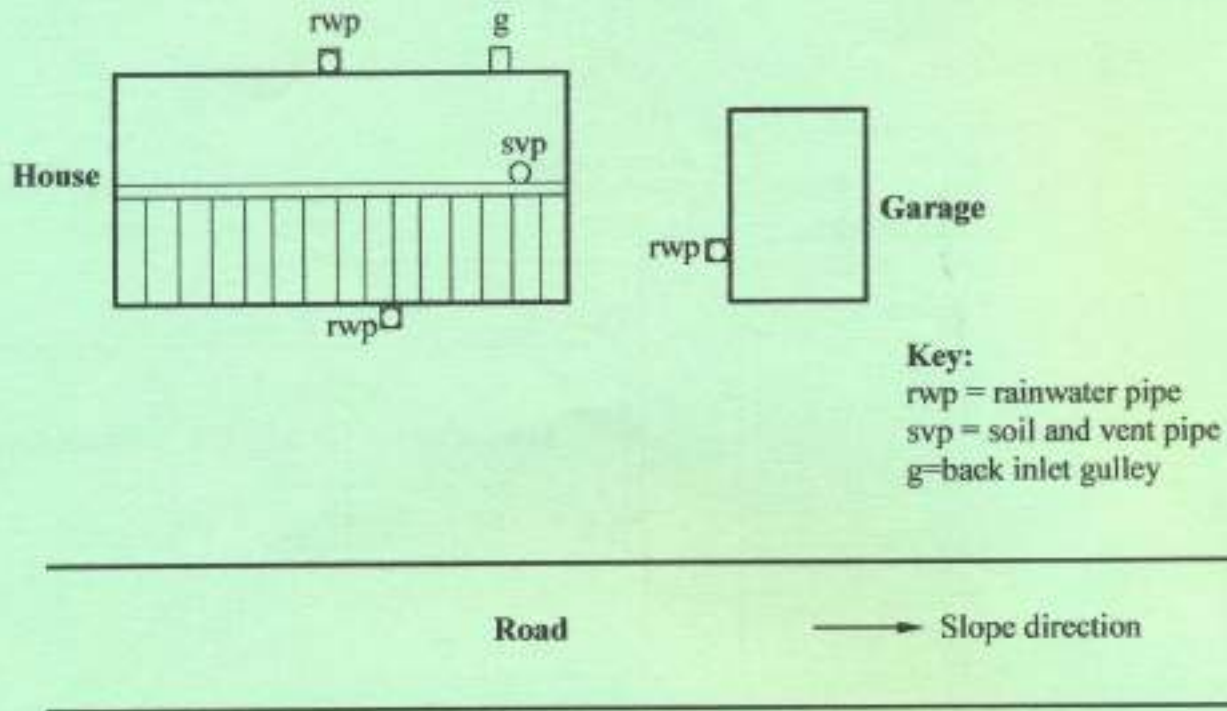


Figure 3

- (b) Sketch and label a typical vertical section through a demountable partition wall. (6 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION

Answer any TWO questions from this section.

4. (a) (i) Outline **three** essential features of a culvert;
- (ii) With the aid of a sketch, describe a drop inlet culvert. (9 marks)

(b) **Figure 4** shows a conventional sewage treatment plant layout.

- (i) Explain the screening process;
- (ii) Sketch a typical section through sludge drying beds.

(6 marks)

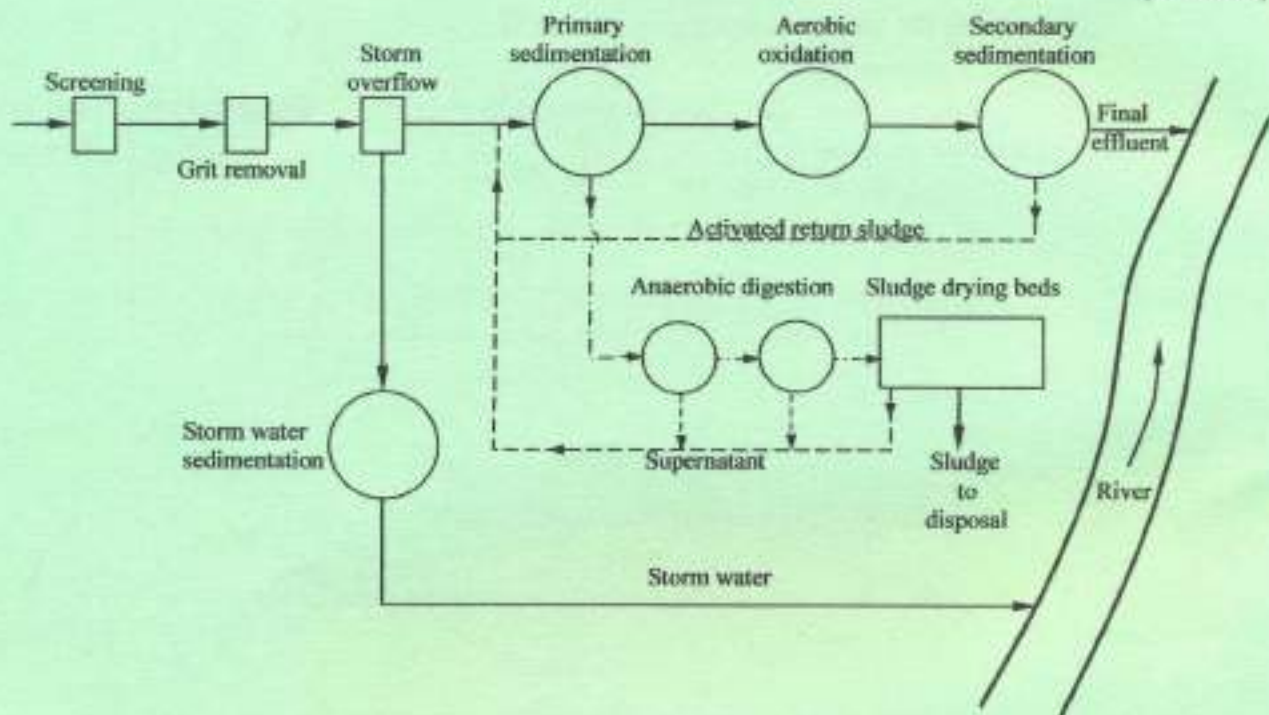


Figure 4

SECTION C: DRAWING

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

7. (a) To a scale of 1:50, draw a vertical cross-section through a flexible pavement given the following data: (20 marks)
- width of estate road = 5500 mm.
 - 250 mm thick compacted murrum sub-base.
 - 100 mm thick compacted dense macadem road-base cambered.
 - 50 mm thick compacted bitumen macadem base course to 1:40 (slope) camber.
 - 125 x 575 mm insitu concrete base to kerb.
 - Concrete haunching to kerb.
 - 150 x 305 half battered kerb to BS 340.
 - 1800 mm grass verge on each side of the road at cross fall of 1:50.
 - 1800 mm footpath on each side of the road made using 50 mm pre cast concrete paving slabs laid on 75 mm murrum base at a slope of 1:50.
 - Surface water drains (or ditch) on each side of the road.
 - Datum level at 1000.000 m, existing GL at 104.800 and proposed road level at centreline as 104.600 m.
 - Assume any other relevant information.

(b) A building has 8 no. 300 x 300 mm reinforced concrete columns resting on 2500 x 2500 x 300 mm thick bases. Using a scale of 1:20, detail the plan and elevation of the base given the following information:

- Concrete blinding 50 mm thick (1:3:6)
- Floor slab 300 mm thick (1:2:4)
- Base slab 300 mm thick (1:2:4)
- Columns: 300 x 300 (1:2:4)
- Reinforcement:
 - Pad footing - Y12 @ 200 mm each way
 - Columns - 4Y12 (main bars) and Y8 links @ 200 mm centres
- Concrete cover to reinforcement:
 - 50 mm cover (base slab)
 - 25 mm cover (columns)
- Levels:
 - Base level of concrete blinding (m) = 120.000
 - Top level of floor slab (m) = 121.500
- Assume any other relevant information. (20 marks)

8. (a) **Figure 5** shows the stairwell for a domestic building. The staircase is to be made of cast-in-situ reinforced concrete. The waist is 150 mm and floor to floor height is 2250 mm.

- (i) Design the staircase if a single flight is used;
- (ii) To a scale of 1:25, draw a plan of the stair;
- (iii) To a scale of 1:25, draw a section through the stair showing the reinforcement

(b) To a scale of 1:25, draw a section through external tanking in mastic asphalt to a basement given the following information:

- Floor to floor height = 3800 mm.
- R.C. floor slab 250 mm thick.
- R.C. basement wall = 200 mm thick.
- 30 mm vertical cement concrete