

2306/303
BUILDING CONSTRUCTION, CIVIL
ENGINEERING CONSTRUCTION AND
DRAWING
Oct./Nov. 2018
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.

Maximum marks for each part of a question are 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) State **four** factors that ensure an efficient site layout. (4 marks)
- (b) Using a labelled sketch, show the freezing technique of ground water exclusion. (6 marks)
- (c) State **three** principles applied when damp proofing walls. (3 marks)
- (d) State **two** disadvantages of single roofs inclined to less than 10°. (2 marks)
2. (a) Figure 1 shows a sliding door. Sketch and label sectional detail A and B. (6 marks)

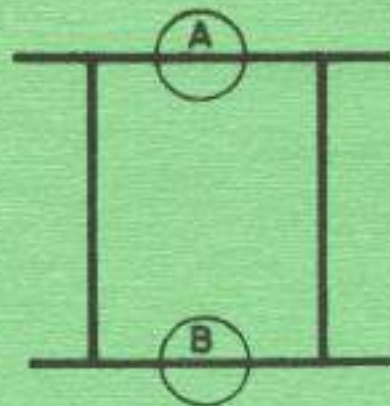


Fig.1



- (b) Explain the following defects in painting:
 - (i) running;
 - (ii) grinning;
 - (iii) sponification;
 - (iv) fading.
 (4 marks)
- (c) State **three** merits of air conditioning. (3 marks)
- (d) State **two** applications of retaining walls. (2 marks)

3. (a) **Figure 2** shows a line diagram of a multi-span factory roof. Sketch and label detail A. (3 marks)

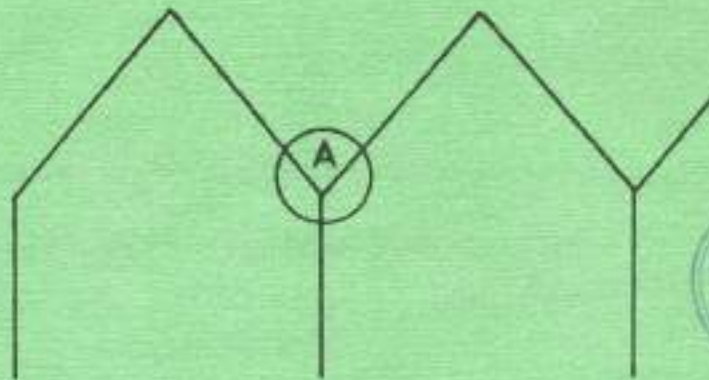


Fig.2

- (b) Outline **three** techniques of ensuring fire resistance in walls and columns. (3 marks)
- (c) Outline **three** principles of a good drainage system. (3 marks)
- (d) (i) Define the term 'shoring'.
 (ii) Sketch and label a section through a vertical shore. (6 marks)

SECTION B: CIVIL ENGINEERING CONSTRUCTION

Answer TWO questions from this section.

4. (a) With the aid of a cross-sectional sketch, describe grillage foundation. (7 marks)
- (b) State **four** factors to consider when designing a concrete tunnel lining. (4 marks)
- (c) Differentiate between shallow and deep wells. (4 marks)
5. (a) Distinguish between active pressure and passive pressure as used in retaining wall. (4 marks)
- (b) State **three** reasons for erecting water front structures. (3 marks)
- (c) State **three** factors affecting selection of a dredging method. (3 marks)
- (d) With the aid of labelled sketches, describe a cess pool. (5 marks)

6. (a) Sketch and label the following pavement joints:
- contraction;
 - warping;
 - expansion.
- (9 marks)
- (b) (i) Sketch and label a cross-section through a rectangular weir.
- (ii) Given that $h = 300$ mm, $b = 400$ mm, $g = 9.81$ and discharge constant is 1, calculate its flow rate.
- (6 marks)

SECTION C: DRAWING

Answer ONE question from this section.

7. (a) To a scale of 1:50, draw an isometric counter fort retaining wall using the following information:

| | |
|---|-----------------|
| Stem thickness | 500 mm |
| Length of retaining wall | 5000 mm |
| 2 No. counter forts @ 1500 mm c/c | |
| Start of the first counterfort | 1500 mm to edge |
| Thickness of counterfort | 500 mm |
| Base slab thickness | 600 mm |
| Height of stem | 4000 mm |
| Counterfort projection from the top of stem | 500 mm |
| Provide four main dimensions | |

(30 marks)

- (b) Using the data given, draw to a scale of 1:10 a section through a rigid pavement.

DATA

| | |
|------------------------------|--------|
| Base layer | 200 mm |
| Slip membrane | 20 mm |
| Concrete slab | 150 mm |
| Tapping | 50 mm |
| Top mesh reinforcement cover | 50 mm |
| Mesh termination from end | 50 mm |



(10 marks)

8. (a) To a scale of 1:25 draw a cross-section through a half turn precast staircase of a building using the following data.

| | |
|---------------------------------|--------------|
| Tread | 250 mm |
| Riser | 150 mm |
| Landing support beam | 200 x 300 mm |
| Wall thickness | 200 mm |
| Landing | 1200 mm |
| Hard core thickness | 250 mm |
| Floor slab thickness | 150 mm |
| Floor to floor height | 2700 mm |
| Flexible joint | 50 mm |
| Blinding joint | 50 mm |
| Bearing on landing support beam | 100 mm |



Assume any other relevant information.

(20 marks)

(b) Using the data given, to a scale of 1:25 draw a cross-section through a vertical beam form work.

| | |
|--|------------------------|
| Sole plate | 250 x 150 mm |
| Base plate | 150 x 150 mm |
| Prop height | 2000 mm |
| Head tree length | 1200 mm (150 x 100 mm) |
| Braces 100 x 75 mm fixed to props at 1000 mm below the head tree | |
| Side and soffit boards | 500 mm |
| Width of beam | 500 mm |
| Joists | 100 x 50 mm |
| Depth of beam | 600 mm |
| Runners | 100 x 100 mm |
| Blocking piece 100 x 100 mm at 50 mm from end of head tree | |
| Struts | 50 x 75 mm |
| Floor decking | 50 mm |
| Folding wedges | |



Assume any other necessary information.

(20 marks)

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