C-09-C-**607**

3728

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH / APRIL - 2019

DCE - VI SEMESTER EXAMINATION

STRUCTURAL ENGINEERING DRAWING

Time : **3** Hours]   [Total Marks : **60**

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PART - A   **4 × 5 = 20**

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Instructions :   *(1) Answer all questions.*

(2) Each question carries four marks.

(3) Part-A may be drawn not to scale.

(4) Assume suitable data if necessary.

(5) For main reinforcement, use HYSD bars.

1   State three guiding principles for positioning of beams in a structural planning of buildings.

2   Draw the position of columns and beams in a given line diagram of building.

Room; 3.0 × 3.5	Room; 3.0 × 3.5
2 m wide corridor	

3   Prepare a bar bending schedule and calculate the quantity of steel for a simply supported single reinforced rectangular beam having the following :

(a)   Specifications;

Clear span of the beam: 3500mm

Bearing on either side: 200mm

Width of the beam: 300mm

Overall depth of the beam: 450mm

(b) Materials :

Concrete: M20 grade concrete

Steel: Fe-415

(c) Reinforcement:

Bars in tension: 5#20, out of which 2bars are crancked at 45º at a distance of 400mm fro the face of the support.

Hanger bars: 2#12

Stirrups: #8, two legged stirrups at 250mm c/c.

(d) Covers :

Bottom clear cover : 40mm

Top clear cover : 40mm

Side clear cover : 40mm

4   Draw the sectional elevation of an isolated column footing reinforcement details of column and footing with the following specifications.

Column :

Size of column = 400 × 400mm.

Reinforcement = 4no,s of 16mm dia with

Lateral ties 6mm dia @ 220mm c/c

Footing :

Size of footing - 2200mm × 2200mm.

Reinforcement -12mm dia bars @ 160mm c/c

In both directions

Depth -450mm

Base coarse thickness -150mm with PCC 1:2:4

5   Prepare a bar bending schedule -and calculate the quantity of steel required for a simple supported one way slab with the following specifications, when the alternate main bar are cracked on both sides.

(i)   Clear span (Shorter) = 2.8m

(ii) Clear span (Longer) = 6.Om

(iii) Bearings on all the sides = 230mm

(iv) Overall depth of the slab = 130mm

(v) STEEL :

Main steel = # 10mm at 170mm c/c, all main bars are cranked both sides, at a distance of 280mm from the face of the support.

Distribution steel = # 8 at 200mm c/c

Hanger bars = 3 # 8 on each side(to support cranked bars)

(vi) Covers :

Bottom clear cover = 20mm

Top clear cover = 20mm

Side covers = 25mm

(vii) Materials :

Concrete = M 20 grade concrete

Steel = Fe - 415 steel.

PART - B   20×2=40

Instructions :   *(1) Answers all questions.*

                   (2) Each question carries twenty marks.

                   (3) Draw all question to scale.

                   (4) Assume suitable data if necessary.

6   Draw the reinforcement details of a simply supported one way slab to a suitable scale with the following specifications,

(i)   Bottom plan of the reinforcement

(ii)   Cross section along the shorter span.

     (a)   Clear span (Shorter) = 2.8m

     (b)   Clear span (Longer) = 6.0m

     (c)   Bearings on all the sides = 230mm

     (d)   Overall depth of the slab =130mm

     (e)   STEEL :

Main steel = # 10mm at 170mm c/c, all main bars are cranked on one side alternatively, at a distance of 280mm from the face of the support.

Distribution steel= # 8 at 200mm c/c

Hanger bars = 3 # 8 on each side (to support cranked bars)

(f) Covers :
Bottom clear cover = 20mm
Top clear cover = 20mm
Side covers = 25mm

(g) Materials :
Concrete = M 20 grade concrete
Steel = Fe - 415 steel.

7 Draw the reinforcement details of a longitudinally spanned dog legged staircase with the following specifications.

Specifications:

(i) Size of the stair case room = 2500 × 4000mm

(ii) Height of the floor = 3600mm

(iii) Tread(T) = 270mm

(iv) Rise (R) =150mm

(v) Thickness of waist slab = 200mm

(vi) Bearing in the wall = 200mm

(vii) Thickness of the wall = 300mm

(viii) Projection in to the basement = 300mm × 300mm

(ix) Width of the stair case =1240mm

Reinforcement :

(i) Main bars =12mm dia bars at 160mm c/c

(ii) Distribution bars = 8 mm dia bars at 170 mm c/c

(iii) Additional bars of 12mm dia at 140mm c/c at the junction of landing slab with the waist slab. Project these bars through a distance of 1000mm from the junction point down words parallel to the waist slab.

Covers :

(i) Bottom clear cover = 20mm

(ii) All the remaining covers = 25mm

Materials used:

(i) Concrete = M 20 grade concrete

(ii) Steel = Fe - 415 steel.