C09–C–607

3728

BOARD DIPLOMA EXAMINATION, (C–09)

MARCH/APRIL—2018

DCE—SIXTH SEMESTER EXAMINATION

STRUCTURAL ENGINEERING DRAWING

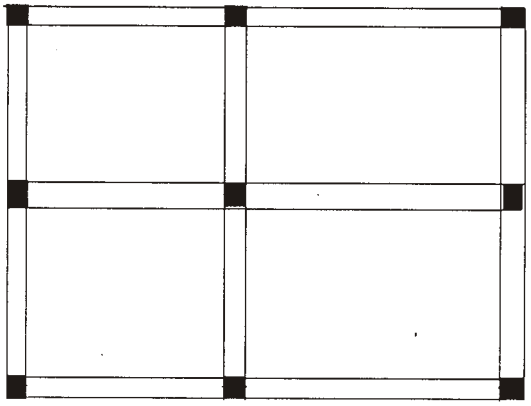
Time : 3 hours] [*Total Marks* : 60

PART—A 4×5=20

Instructions : (1) Answer **all** questions.
(2) Each question carries **four** marks.
(3) To be drawn not to scale.
(4) Assume suitable data, if necessary.

1. State any two guiding principles for positioning of columns and beams in a structural planning of a building. 2+2

2. Redraw the figure given below and name the columns and beams as per the 'column reference scheme' and 'grid reference scheme : 2+2

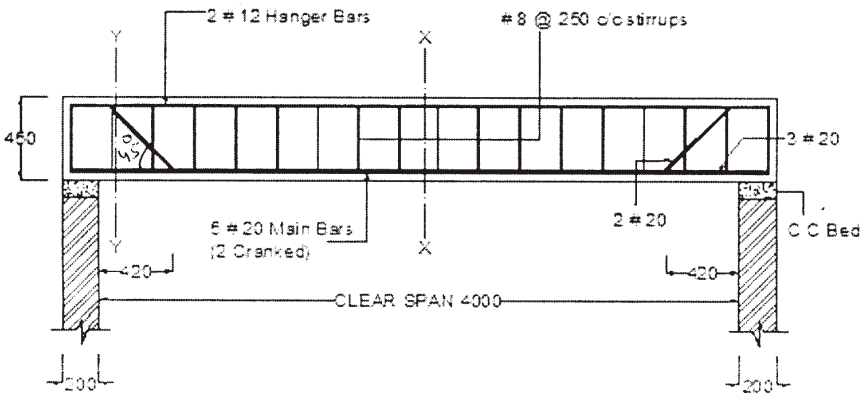


3. Draw the longitudinal section of the T-beam with the following specifications and show the reinforcement details :

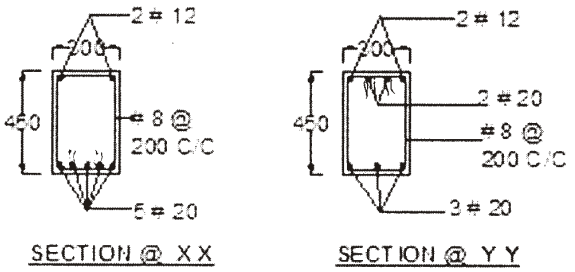
Clear span of the T-beam : 5800 mm
Bearing on walls : 230 mm
Thickness of roof slab : 120 mm

Overall depth of T-beam	: 400 mm (including slab thickness)
Width of rib	: 230 mm
Reinforcement main bars	: 16 mm dia 4 nos. (out of which two bars cranked at a distance of 800 mm from the face of the support)
Hanger bars	: 12 mm dia 2 nos.
Stirrups	: 8 mm dia two-legged stirrups at 200 mm/c/c throughout covers
Bottom and top clear cover	: 25 mm
End cover	: 40 mm

4. Prepare the bar bending schedule and find the quantity of steel required for the main reinforcement for the simply supported beam shown in the figure below. Top and bottom covers are 25 mm and side cover is 40 mm :

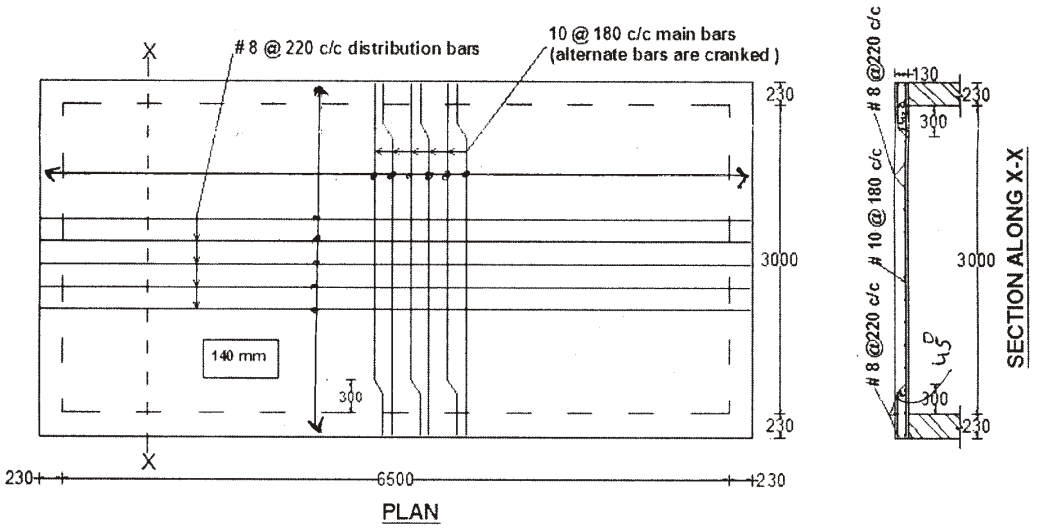


LONGITUDINAL SECTION



SECTION @ X X SECTION @ Y Y

5. Prepare the bar bending schedule and find the total quantity of steel required for the one-way slab shown in the figure below :



PART—B

20×2=40

Instructions : (1) Answer **all** questions.
(2) Each question carries **twenty** marks.
(3) Assume suitable data, if necessary.

6. Draw the reinforcement details of a simply supported singly reinforced RCC beam with the following specifications :

(i) Specifications :

Clear span of the beam	: 3500 mm
Bearing on either side	: 200 mm
Width of the beam	: 300 mm
Overall depth of the beam	: 450 mm

(ii) Materials :

Concrete	: M-20 grade
Steel	: Fe-415

(iii) Reinforcement :

Bars in tension : 4#16, out of which two middle bars are cranked at a distance of 400 mm from the face of the support at 45°
Hanger bars : 2#12
Stirrups : #8, two-legged stirrups at 220 mm c/c throughout

(iv) Covers :

Top and bottom clear cover : 25 mm
Side clear cover : 40 mm

Draw the following views to a scale of 1 : 20 :

(a) Longitudinal section of beam

(b) Cross-section at the midspan

(c) Cross-section near the suuport 10+5+5

7. Draw the longitudinal section of staircase spanning longitudinally with the following specifications (draw details for one flight only) :

(i) Specifications :

Size of the staircase room : 4000 mm 2500 mm (inside)
Level difference between the floors : 3600 mm
Width of the stair : 1200 mm
Landing width : 1000 mm
Tread : 270 mm
Rise : 150 mm
Thickness of waist slab : 200 mm
Bearing on wall : 200 mm
Size of the projection to basement : 300 mm 300 mm

(ii) Materials

Concrete : M-20 grade
Steel : Fe-415

(iii) Reinforcement :

Main reinforcement	: #12 at 150 mm c/c (alternate bars are cranked at a distance of 600 mm from the bottom end)
Distribution reinforcement	: #10 at 200 mm c/c
Additional bars	: #12 at 220 mm c/c (at the junction of landing slab with waist slab and extend these bars through a distance of 1000 mm from the junction point downwords into waist slab)

(iv) Covers :

Top and bottom clear cover	: 20 mm
Side clear cover	: 25 mm

Draw to a scale of 1:25.

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