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C14–C–607

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2017

DCE—SIXTH SEMESTER EXAMINATION

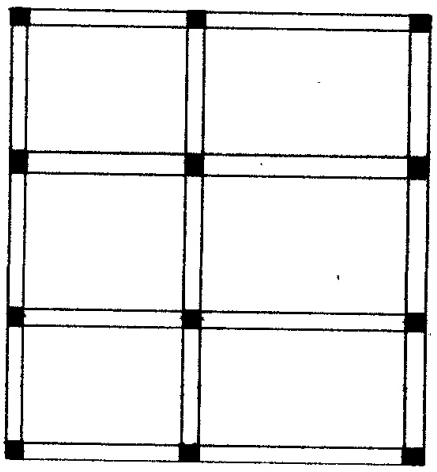
STRUCTURAL ENGINEERING DRAWING

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

PART—A 4×5=20

Instructions : (1) Answer **all** questions.
(2) Each question carries **four** marks.
(3) Part—A may be drawn not to scale.
(4) Assume suitable data, if necessary.
(5) Steel tables are permitted.

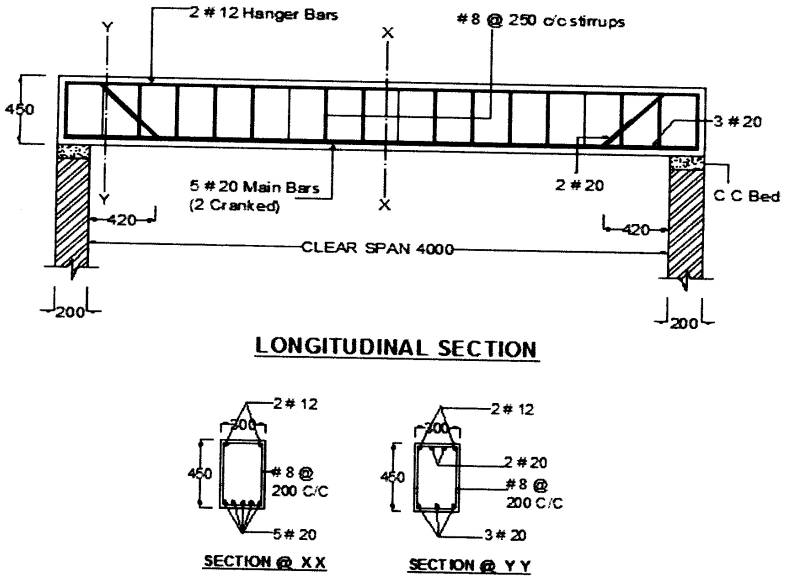
1. Redraw the figure given below and name the columns and beams as per the 'column reference scheme'.



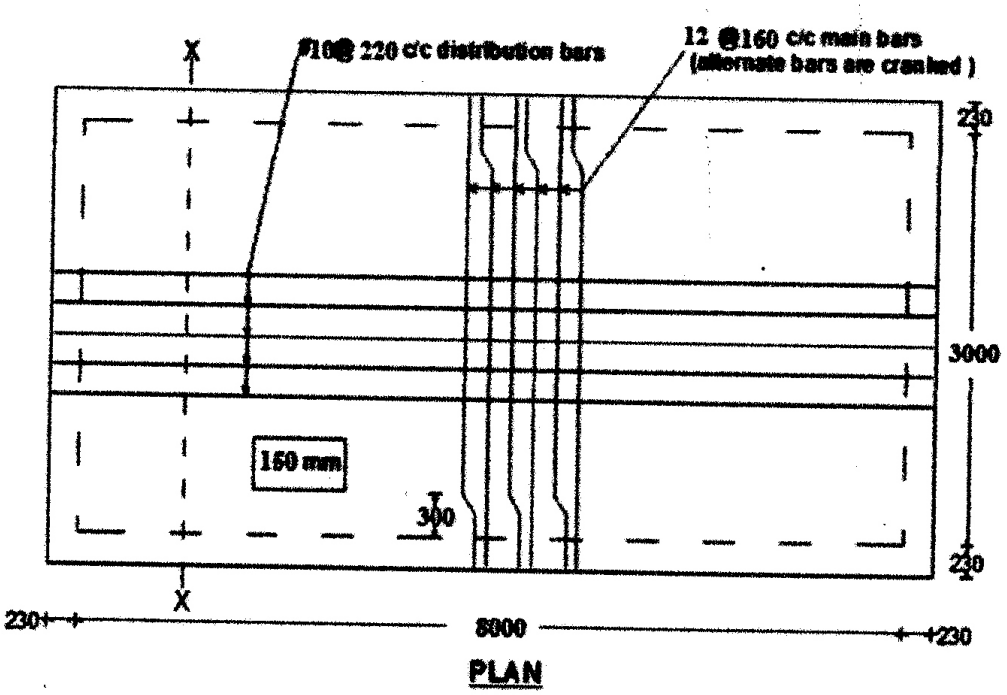
2. Draw the longitudinal section of the T-beam with the following specifications :

Clear span of the T-beam	:	4700 mm
Bearing on walls	:	230 mm
Thickness of roof slab	:	140 mm
Overall depth of tee-beam	:	450 mm (including slab thickness)
Width of rib	:	230 mm
Reinforcement		
Main bar	:	18 mm dia 4 nos. (out of which 2 bars cranked at a distance of 600 mm from the face of the support)
Hanger bars	:	12 mm dia bars, 2 nos.
Stirrups	:	8 mm dia 2-legged at 200 mm c/c
Covers		
Bottom and top clear cover	:	256 mm
End cover	:	40 mm

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



4. Obtain the reinforcing details (diameter, length and no. of bars) of the one-way slab shown in the figure below. Top and bottom covers are 20 mm and side cover is 25 mm :



5. Draw the cross section of a built-up column with batten system, from the following specifications :

Overall height of the column is 5000 mm consists of 2 nos. ISMC 250 @ 30·4 kg/m placed back-to-back keeping a clear distance of 180 mm between the webs.

The sizes of end battens are 200 mm deep × 10 mm thick

Spacing between the consecutive battens is 700 mm

6 mm fillet weld of 50 mm lap length and over the entire depth of batten on end face is provided as batten connection with the main component.

For ISMC 250 @ 30·4 kg/m, h = 250 mm; b_f = 80 mm; t_f = 14·1 mm; t_w = 7·1 mm

PART—B

20×2=40

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

6. Draw the longitudinal section of staircase spanning longitudinally with the following specifications :

(i) Specifications :

Size of the staircase room	: 4000 × 2500 mm (inside)
Level difference between the floors	: 3300 mm
Width of the stair	: 1200 mm
Landing width	: 1000 mm
Tread	: 270 mm
Rise	: 150 mm
Thickness of waist slab	: 180 mm
Bearing on wall	: 200 mm
Width of wall	: 300 mm
Size of the projection to basement	: 300 × 300 mm

(ii) Materials :

Concrete	: M-20 grade
Steel	: Fe 415

(iii) Reinforcement :

Main reinforcement	: #12 at 180 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 the	: #12 at 220 mm c/c (at junction of landing slab with waist slab and extend these bars through a distance of 1000 mm from the junction point downwards into waist slab)

(iv) Covers :

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

Draw to a scale of 1 : 25.

7. A built-up column with lacing system has the following specification :

Overall height of the column is 5000 mm consists of 2 nos. ISMC 350 @ 42·1 kg/m placed back-to-back keeping a clear distance of 180 mm between the webs

The column is provided with single-lacing system. The sizes of lacing flats are 50 mm × 10 mm thick

Lacing is at an angle of 45° with the axis of the column

Spacing between the consecutive lacing connections is 600 mm

6 mm fillet weld of 100 mm length is provided at lacing connection with the main component

At the end of column, 320 mm × 150 mm × 10 mm plates are provided and are connected with 6 mm fillet weld all round

For ISMC 350 @ 42·1 kg/m, h = 350 mm; b_f = 100 mm; t_f = 13·5 mm; t_w = 8·1 mm

Draw the following views to a scale of 1 : 10 :

(a) Elevation (front view) 13

(b) Cross-sectional plan 7

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