

4721

BOARD DIPLOMA EXAMINATION, (C-14)

MARCH /APRIL-2019

DCE - SIXTH SEMESTER EXAMINATION

STRUCTURAL ENGINEERING DRAWING

Time: 3 Hours]

[Max.Marks: 60

**PART-A****5x4=20M**

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

- 1) State any four guiding principles for positioning of columns in a structural planning of a building.
- 2) Draw the longitudinal cross section of an isolated square footing for a column with the following specifications.

Size of the column : 300 x 300 mm

Size of the footing : 2000 x 2000 mm

Thickness of the footing : 400 mm

Base coarse thickness : 150 mm with P.C.C, 1:2:4

Reinforcement for footing : 12 mm dia at 200 mm c/c in both the directions. The horizontal lap length of the column reinforcing bar is 500 mm each.

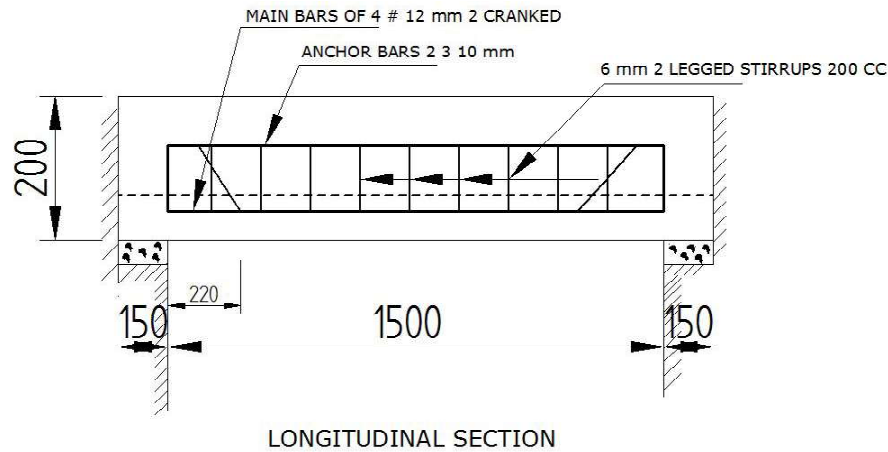
Reinforcement for column:

Main bars : 16 mm dia bars, 4 nos.

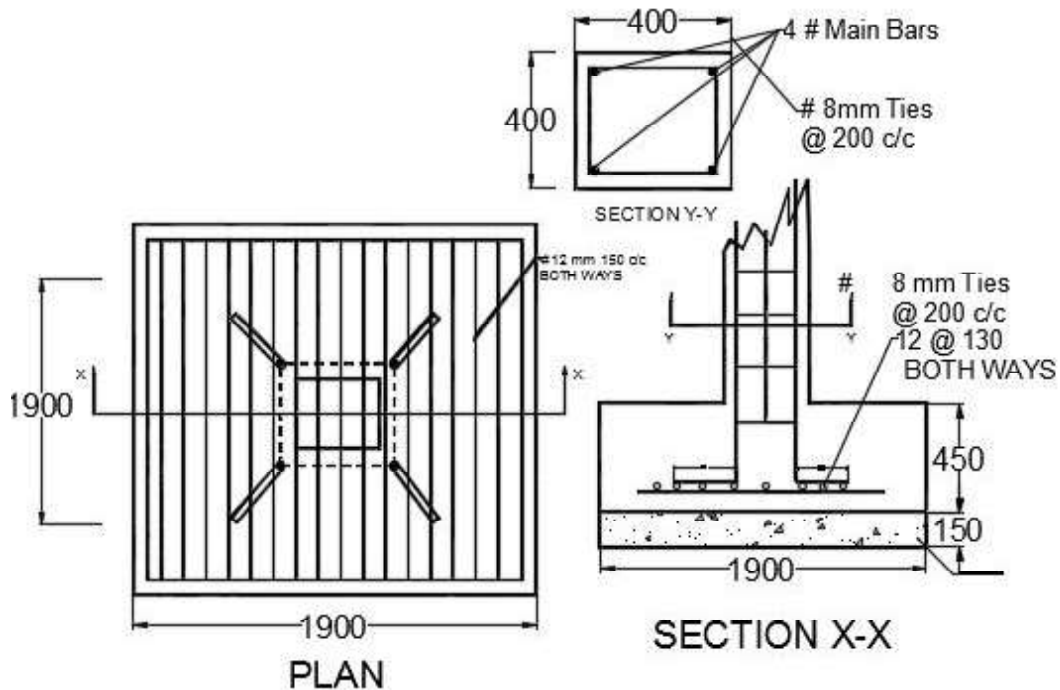
Lateral ties : 8mm dia ties at 200 mm c/c.

All covers : 50 mm

- 3) Prepare the bar bending schedule and find the quantity of steel required for the main reinforcement for lintel 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 & no. of bars) of the column and footing shown in the figure below. Bottom and side covers are 50 mm. Also prepare the quantity of steel required for the footing.



ALL DIMENSIONS ARE MM

- 5) Draw the details of reinforcement at the junction of column and beam of a frame designed as earthquake resistant structure.

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## PART-B

20x2=40M

- Instructions:**
- 1) Answer **all** questions.
  - 2) Each question carries **twenty** marks.
  - 3) Assume suitable data, if necessary.
  - 4) The drawing must be to the scale.
- 6) Draw the reinforcement details of a simply supported RCC one way slab with the following specifications.

(i) Specifications:

Size of the room	:	3.2 m x 6.5 m
Edge conditions	:	simply supported
Overall depth of the slab	:	140 mm
Bearing on walls	:	230 mm

(ii) Materials :

Concrete	:	M-20 grade
Steel	:	Fe 415

(iii) Reinforcement:

Main reinforcement	:	#12 at 190 mm c/c (alternate bars are cranked at a distance of 400 mm from the face of the support)
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Distribution reinforcement : #10 at 220 mm c/c

Provide 3 -#8 hanger bars at each edge to keep to bars in position.

(iv) Covers :

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

Draw the following views to a scale of 1:20. (10+5+5)

- (a) Bottom plan of the reinforcement
- (b) Cross section along the shorter span at mid span
- (c) Cross section along the longer span at mid span.

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- 7) From the following specifications of steel built up beam, draw the following.
- (a) Longitudinal elevation of built up beam (10+5+5)
- (b) Cross section of the beam at the mid span (c) Plan at top.

Specifications:

- (i) Distance between the supports=9,000 mm
- (ii) Width of masonry wall support=300 mm
- (iii) Built up beam consists of one ISMB 450 provided with two flange plates of size 250 mm x 12 mm, both in top and bottom flanges.
- (iv) Outermost flange plates are curtailed at a distance of 900 mm from the face of the support.
- (v) The flange plates are connected to the R.S.J by fillet weld of size 6mm, 180 mm length at spacing of 250mm.
- (vi) At the point of curtailment of the upper flange plate, the end of the plate is fillet welded of 6 mm over the entire width.
- (vii) Suitable bearing plates at the ends are provided.
- For ISMB @ 450kg/m,  $h=450\text{mm}$ ;  $b_f=150\text{mm}$ ;  $t_f=17.4\text{mm}$ ;  
 $t_w=9.4\text{mm}$

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