



C14-C-607

4715

BOARD DIPLOMA EXAMINATION, (C-14)
MARCH/APRIL—2018
DCE—SIXTH SEMESTER EXAMINATION
STRUCTURAL ENGINEERING DRAWING

Time : 3 hours]

[Total Marks : 60

PART—A

4×5=20

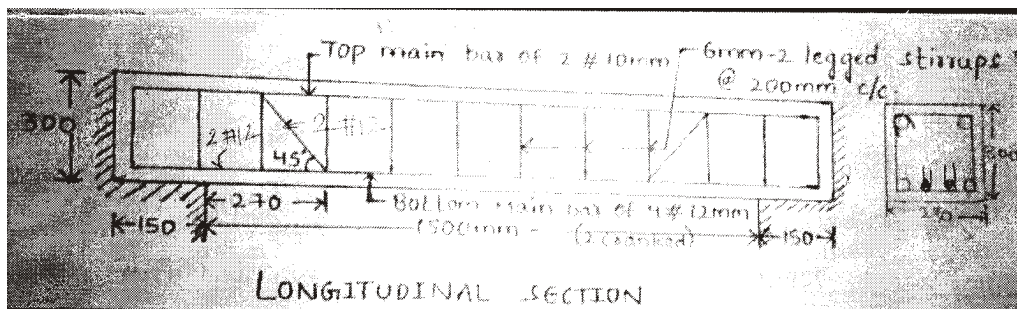
Instructions : (1) Answer **all** questions.

(2) Each question carries **four** marks.

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

(4) Assume suitable data wherever necessary.

1. State four important points to be considered in positioning and orientation of columns.
2. Prepare the bar bending schedule and find the quantity of steel required for the main reinforcement for lintel beam shown in fig. below. Top and bottom covers are 25 mm and side covers are 40 mm.



3. Draw the cross-section of an isolated column footing with the following specifications :

Column :

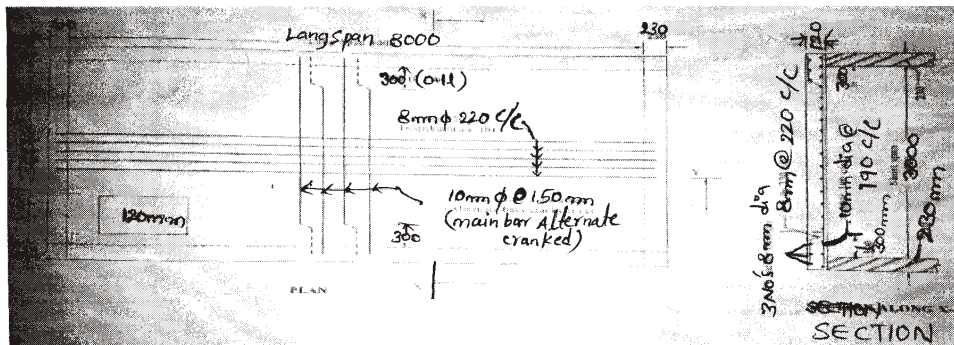
- (a) Size of column = 300 mm × 300 mm
 (b) Reinforcement = 12 mm dia @ 4 No. HYSD vertical bars, one number for each corner with sufficient holding into base concrete with lateral ties 6 mm dia @ 150 mm c/c with cover 40 mm.

Footing :

- (a) Size of footing = 1200 mm × 1200 mm
 (b) Thickness of footing = 700 mm (uniform)
 (c) Thickness of PCC = 300 mm
 (d) Reinforcement = #10 mm @ 100 mm c/c on both directions.

The horizontal lap length of the column reinforcing bar is 300 mm each. All the covers are 50 mm. Depth of excavation below ground level is 2.0 m, show the column height up to 1.5 m above the ground level.

4. Read the cross-section and plan of one-way slab shown in fig. below and prepare the bar bending schedule and find the quantity of steel required. Top and bottom covers are 20 mm, side covers 25 mm.



5. Draw the cross-section at mid-span of the beam, with the following specifications of a built-up beam :

Specifications :

- (a) Built-up beam consist of one ISMB 600 provided with two flange plates of size 280 mm × 12 mm both in top and bottom flanges. (t_f 20 mm, t_w 12 mm, b_f 210 mm)

- (b) ^{*} Outer most flange plates are curtailed at a distance of 900 mm from the face of the support.
- (c) The flange plates are connected to the RSJ by fillet weld of size 6 mm, 125 mm length at spacing of 150 mm.

PART—B

20×2=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **twenty** marks.

(3) Must be drawn to suitable scale.

(4) Assume suitable data wherever necessary.

- 6.** Draw the reinforcement details of a simply supported two-way slab whose corners are free to lift with the following specifications : 8+8+4=20

Specifications :

(a) Size of room = 4.50 m × 5.50 m. HYSD bars are used in reinforcement.

(b) Thickness of slab = 140 mm

(c) Bearing on walls = 230 mm

(d) Reinforcement details :

(i) Along short span = 10 mm dia @ 100 mm c/c, alternatives bars cranked at a distance of L/5 from the face of support.

(ii) Along long span = 10 mm dia @ 150 mm c/c, alternatives bars bent up at a distance of L/5 mm from the face of support.

(iii) Hanger bars = 6 mm dia 3 nos. on each end (adopt a scale 1 : 30)

Draw (i) bottom plan reinforcement, (ii) top plan reinforcement and (iii) cross-section at mid span along shorter direction.

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Covers : Top and bottom clear covers = 20 mm; Side covers
= 25 mm; Materials = M20 grade concrete and Fe415 steel.

$$8+8+4=20$$

7. Draw the following views of built-up column in lacing with the specifications given : 4+8+8=20

- (a) Cross-sectional plan
- (b) Elevation (front view)
- (c) Elevation (back view)

Specifications :

- (i) Actual length of column = 5000 mm
- (ii) Main column section consists of 2 nos. of ISMC 300 @ 35.8 kg/m, placed back to back 180 mm. ($b = 90$, $t_f = 13.6$, $t_w = 7.6$ mm)
- (iii) Column design : lacing system with angle of inclination 45°
- (iv) Size of lacing flats = 65 mm \times 12 mm
- (v) Size of tie plates = 300 mm \times 10 mm
- (vi) Consecutive spacing of lacing = 56 mm
- (vii) Dia of rivet adopted = 20 mm (scale 1 : 10)

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