C14-C-**607**

4715

BOARD DIPLOMA EXAMINATION, (C-14)

MARCH / APRIL - 2019

DCE - VI SEMESTER EXAMINATION

STRUCTURAL ENGINEERING DRAWING

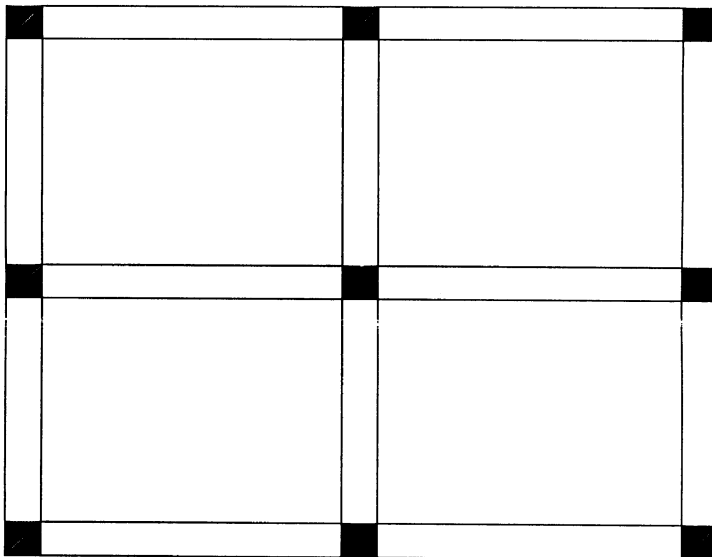Time : **3** Hours]   [Total Marks : **60**

PART - A   **5×4=20**

Instructions :   (1) Answer **ALL** questions.
(2) Each question carries **FOUR** marks.
(3) Drawing should be neat and clear with the necessary dimensions.
(4) All dimensions are in mm.
(5) Need not draw to a scale.

1   Redraw the figure given below and name the columns and beams as per "Grid reference scheme."

2 Draw the longitudinal section for a simply supported rectangular beam of size 230mm×400mm, on the clear span of 4m, width of the support 300mm. Provide 300×230×150 CC bed at support.

Reinforcement :-

(i) 2#12 as hanger bars

(ii) 3#16 as main bars out of which 1#16 is cranked at 45°, at 'l/7' from the support on both sides.

(iii) Two legged #8 vertical stirrups @150mm c/c uniform through out.

3 Draw the cross section of lintel with sunshade showing the reinforcement in the lintel and in the sunshade.

Specifications :

Lintel size 230×300mm

Sunshade Projection 600mm

Thickness sunshade 90mm uniform

Reinforcement :

(a) Lintel :–

2#12 at top

2#12 at bottom

$\phi\, 6\, mm$ two legged stirrups @ 150 C/C

(b) Sunshade :–

#8@100 mm C/C as main reinforcement and #8@150 mm C/C as distributors.

4 Prepare the bar bending schedule for a reinforcement details of a simply supported one-way slab given below. Top and bottom covers are 20mm and side cover is 25mm. Thickness of the slab is 150mm. (Calculation of additional bars for supporting cranked bars are not required).

PLAN (ONE-WAY SLAB)
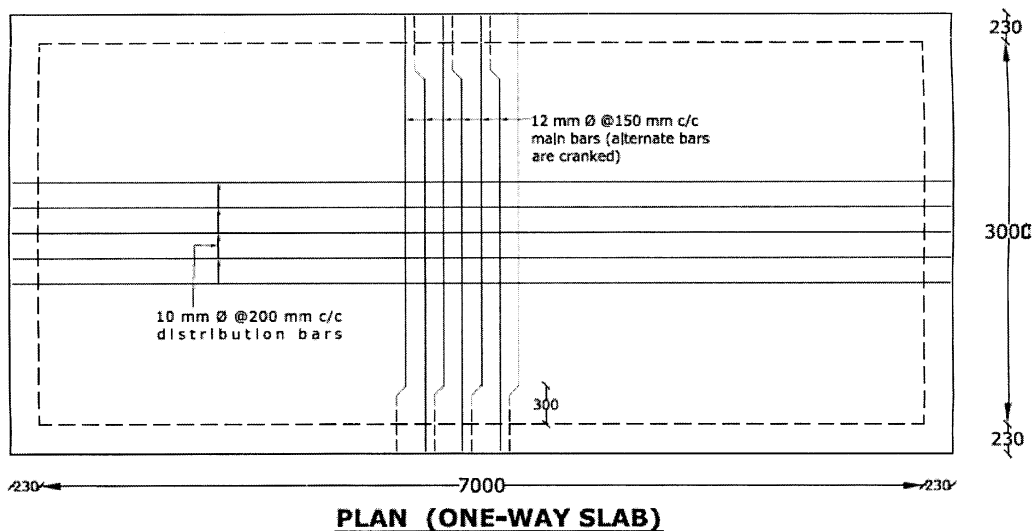
5 Draw the elevation (front view) of a built up column with lacing system from given specificaitons.

Specification :

Overall height of the column is 5000mm consist of 2 Nos ISMC 350@42.1Kg/m placed back to back keeping a clear distance of 180mm between the webs. The column is provided with single lacing system. The sizes of lacing flats are 50mm × 10mm thick. Lacing is at an angle of 45° with the axis of the column.

Spacing between the consecutive lacing connections is 640mm. 6mm fillet weld of 100mm length is provided at lacing connection with the main component. At the end of column, 320mm×150mm×10mm plates are provided and are connected with 6mm fillet weld all around.

For ISMC 320@42.1Kg/m take b = 100; t_f = 13.5; t_w = 8.

PART - B   **2×20=40**

Instructions :   *(1)   Answer **ALL** questions.*
                   *(2)   Each question carries **TWENTY** marks.*
                   (3)   Drawing should be neat and clear with the necessary dimensions.
                   (4)   All dimensions are in mm.
                   (5)   Assume suitable data if necessary.

6   Draw the longitudinal section of the dog-legged stair case showing details of reinforcement in longitudinal section to a scale 1:20. (for one flight)

   (i)   Specifications :

Size of stair case room	:	2000mm×5000mm
Level difference between the floors:		3300mm
Width of stair case	:	1000mm
Thickness of waist slab	:	120mm
Tread	:	270mm
Rise	:	150mm
Bearing in the wall	:	200mm
Thickness of the wall	:	300mm
Projection into basement	:	300mm×300mm

   (ii)   Covers :

Top and Bottom clear covers	:	20mm
End clear covers	:	25mm

   (iii)   Reinforcement Details :

Main Reinforcement	:	12mm ϕ @ 100mm c/c (Alternate bars are cranked at 1000mm from bearing)
Distribution reinforcement	:	8mm ϕ @200mm c/c
Additional bars	:	10mm ϕ @100mm c/c

   Additional bars are provided at the junction of landing slab with waist slab and extended these bars through a distance of 1000mm from the junction point downwards to waist slab.

(iv) Materials :

Concrete	:	M20 grade
Steel	:	Fe 415

7 From the given specification of a column base with gusset plate, draw the following views.

(a) Plan showing the section above the top level of the gusset plate.

(b) Sectional elevation showing gusset plate and flange of column.

(c) Sectional elevation showing column web, gusset plate, gusset angle.

Specifications :

(i) The column section consists of ISWB 500 @ 95.2 Kg/m flange plates each 325mm×12mm one on each side of column.

(b_f = 250, t_f = 14.7 t_w = 9.9mm)

(ii) Size of the base plate 800×700×20mm. Column is proportioned such that web of the column is parallel to 800mm side.

(iii) Thickness of the gusset plate is 12mm and total depth is 400mm and length is 600mm and placed parallel to the flange. The edges are splayed out at a slope such that the height at the edge is 150mm.

(iv) **Welded Connections :**

Between web of the column, inner side of flange to the base plate, 6mm fillet weld are provided. Between the gusset plate to the flange of the column, 6mm fillet weld is provided over the full height of the gusset plate. Between the gusset plate and the column base, 6mm fillet weld are provided over the full length on both the sides. Six anchor bolts are provided to anchor the base plate to the concrete pedestal.