Code No: **R31011**  **R10**  Set No. 1

**III B.Tech I Semester Supplementary Examinations, October/November - 2019**
**DESIGN & DRAWING OF CONCRETE STRUCTURES**
(Civil Engineering)

Time: 3 hours                                                                                   Max. Marks: 75
Answer any ONE questions Part-A ( 1 x 30 Marks)
And THREE question from Part-B (15x3= 45 Marks)
Use of IS: 456-2000 and design charts from SP-16 is allowed.
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## PART-A

| | | |
|---|---|---|
| 1 | A rectangular reinforced concrete beam is simply supported on two masonry walls 230 mm thick and 6 m apart (centre to centre). The beam is carrying an imposed load of 15 kN/m. Design the beam with all necessary checks. Use M25 concrete and Fe 415 steel. Sketch the details of reinforcement. | [30M] |

**(OR)**

| | | |
|---|---|---|
| 2 | The panel of slab is 4.5 m x 5 m. One short edge and one long edge of the slab is discontinuous and other short edge and long edges are continuous. The slab is restrained with edge beam. Super imposed load is 3.5 kN/m$^2$ and floor finishes being 1.0 kN/m$^2$. Design the slab. Use M20 grade concrete and Fe 415 steel. Sketch the details of reinforcement also. | [30M] |

## PART-B

3  a)  Write short notes on balanced, under reinforced and over reinforced sections with sketches (working stress method).   [8M]

   b)  A doubly reinforced beam 300 mm x 680 mm effective is reinforced on tension and compression side with 4 numbers of 25 mm diameter bars. Compression steel is placed 40 mm from top of the beam. If the beam carries a bending moment of $215 \times 10^6$ N-mm, find the stresses induced in steel and concrete. Take m = 13.33.   [7M]

4  A simply supported R.C.C. beam 200 mm x 400 mm (effective) is reinforced with 4 bars of 22 mm diameter on tension side. The beam is carrying a load of 10 kN/m over a clear span of 8 m. Design the shear reinforcement. Use M 20 concrete and Fe 415 steel bars.   [15M]

5  Design a circular column of 4 m height is effectively held in position at one end and pinned at other end. The diameter of the column is 400 mm. Calculate the reinforcement if it is required to carry a factored axial load of 1600 kN. Use M30 mix and Fe 500 grade steel.   [15M]

6  Design the footing for a reinforced concrete column 225 x 450 mm carrying an axial load of 1075 kN. The bearing capacity of the soil is 100 kN/m$^2$. Use M20 concrete and Fe500 grade steel as reinforcement.   [15M]

7  a)  Explain about the design of formwork for beams.   [8M]
   b)  Write the assumptions in limit state design.   [7M]

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