Code No: RT31013 **R13** SET - 1

III B. Tech I Semester Supplementary Examinations, October/November - 2018
DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS: 456-2000 and design charts for Columns interaction diagrams only from SP-16 is allowed.

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PART –A

1 Design a Reinforced concrete T-beam section supporting a continuous R.C slab at 4m center to centre. The effective length of simply supported T beam is 5m, thickness of slab 100mm, cross section of supporting beam 300 x 400mm (depth).The slab is carrying imposed load of 3kN/m^2 and dead load 2kN/m^2.Use concrete grade M20 and HYSD steel reinforcement Fe415. [28M]
Neatly sketch the detailing of reinforcement and apply relevant checks for design and serviceability conditions.

(OR)

2 Design a combined rectangular footing, supporting two R.C columns exterior and interior each size 300x300mm (steel 16mm 4nos) and 450x450mm (steel 16mm 6nos).The exterior and interior columns are carrying axial loads 150kN and 250kN respectively. The columns are spaced at centre to centre distance 3.2m. The width of footings restricted to 800mm and length of footing should not extend beyond the face of external column. Assume the allowable bearing pressure of soil 300kN/m^2 at 1.20m. Use concrete M25 and steel reinforcement Fe500. [28M]
Neatly sketch the detailing of footing reinforcement and apply relevant checks for punching shear, flexure and anchorage requirements

PART -B

3 Find the cross sectional area of concrete and steel for a R.C simply supported rectangular beam of effective span4m, carrying dead load 2kN/m and live load4kN/m. Use concrete grade M20 and HYSD steel Fe415.(Use working stress method). Assume the following data. [14M]
Steel young's modulus Es=2.1x10^5MPa, modular ratio m=13, clear cover=40mm.

4 A simply supported rectangular R.C beam300x450mm depth, consist 4nos 16mm diameter tension reinforcement and 2nos 12mm diameter compression reinforcement at 30mm clear cover. Find out the moment capacity of beam if concrete grade M25 and HYSD steel Fe500 used. [14M]

5 A rectangular R.C beam of size 250x400mm reinforced with 4nos 12mm tensile steel and simply supported over an effective span of 4m subjected to total dead load 3kN/m, imposed load 8kN/m.UseM20 concrete, steel Fe415. Design the beam for shear reinforcement in combination of vertical stirrups and bent up bars. [14M]

6 A R.C roof slab of size 3x5m simply supported over four sides of 300mm thick wall and carrying dead load 2kN/m^2 and imposed load 4kN/m^2. Design the slab for shear, bending and torsion. Use concrete M20 and HYSD steel Fe415. [14M]

7 Design the reinforcement of R.C square column 300x300mm size fixed at both ends over a clear height of 6m .The column carrying axial load 30kN and moment 2kN-m .Apply relevant design checks and neatly detail the reinforcement. Use concrete grade M25 and HYSD steel Fe500. [14M]

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