

III B. Tech I Semester Supplementary Examinations, May - 2016
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 from SP-16 is allowed.

For all designs adopt Limit State Method

PART –A

- 1 Design a reinforced concrete footing for a column of section 350×350 mm which is subjected to an axial load of 1000kN and uniaxial moment of 350kN.m at service state. Consider weight of soil = 20kN/m^3 , angle of repose = 30° , allowable bearing capacity of soil = 150kN/m^3 , concrete of grade M20 and steel of grade Fe 415. [28M]

(OR)

- 2 Design a continuous R.C. slab for a class room 6m wide and 12m long. The roof is to be supported on R.C.C. beams spaced at 3.0m intervals. The width of beam should be kept 230mm. The superimposed load is 3kN/m^2 and finishing load expected is 1kN/m^2 . Use M20 concrete and Fe 415 steel. [28M]

PART -B

- 3 a) Justify the Code specification for the limiting neutral axis depth in Limit State Method. [7M]
- b) What is the fundamental assumption in flexural theory? Is it valid at the ultimate state? [7M]
- 4 A rectangular beam is 200mm wide and 500mm deep. It is reinforced with 6 bars of 20mm diameter in compression with an effective cover of 50mm. Determine the area of tension reinforcement needed to make the beam section fully effective. What then would be the moment of resistance? Use M20 concrete and Fe 415 steel. [14M]
- 5 a) The provision of minimum stirrup reinforcement is mandatory in all reinforced concrete beams. Why? [7M]
- b) Discuss the torque-twist relationship for (i) plain concrete, and (ii) reinforced concrete members subjected to pure torsion. [7M]
- 6 Design an axially loaded braced rectangular column for the following data. [14M]
 Ultimate axial load $P_u = 4000$ kN
 Unsupported length $l = 3.25$ m
 Effective lengths $l_{ex} = 3.0$ m and $l_{ey} = 2.5$ m
 Grade of concrete: M20 and grade of steel: Fe 415.
- 7 a) What are the advantages and disadvantages of providing large clear cover to reinforcement in flexural members? [7M]
- b) Describe briefly the load transfer mechanism in a two-column combined footing. [7M]