Roll No ....

CE - 504

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B.E. V Semester

Examination, December 2015

Structural Design and Drawing-I (RCC)

Time : Three Hours

Maximum Marks : 70

Note : i)   Attempt any five questions, one from each unit. All questions carry equal marks.

ii)   Use of IS: 456-2000 is permitted.

iii)   Draw reinforcement details wherever required.

iv)   Missing data if any, may be suitably assumed.

Unit - I

1. a)   Explain the terms partial safety factors for load and partial safety factors for material. Also write the values recommended by IS 456:2000.   4

   b)   Explain the concrete stress block recommended by IS 456:2000 for limit state of collapse in flexure. Derive the expression for lever arm for singly reinforced section.   10

OR

   a)   Discuss the assumptions of working stress method of design.   4

   b)   Show that limiting depth of neutral axis for Fe415 is 0.48 times the effective depth.   10

Unit - II

2.   A singly reinforced R.C. beam has an effective depth of 300mm and a breadth of 230mm. It contains 3-12mm bars. Calculate the shear reinforcement needed for a factored shear force of 100kN. Take M20 grade concrete and Fe415 grade stirrups.   14

OR   rgpvonline.com

A four span continuous beam, each of span 4m, is subjected to a uniformly distributed load of 20kN/m throughout its length. Design the beam for flexure.   14

Unit - III   rgpvonline.com

3.   Design a slab for a room 5.0m × 4.0m clear in size if the live load is 2kN/m^2 and the slab is continuous over two adjacent edges only.   14

OR

Explain :   14

   a)   Application of Yield line theory for analysis of one way continuous slab and

   b)   Limitations of Direct Design Method for analysis of Flat Slab.

Unit - IV

4.   What do you mean by effective length of column? Explain the procedure of estimating effective depth. Design an axially loaded circular column with spiral transverse reinforcement subjected to load of 1200kN.   14

OR

Two columns A and B spaced 3.2m center to center are carrying axial loads of 1500 kN and 1250 kN respectively. Column A is of size 500mm × 500mm and column B is of size 450mm × 450mm. Design a combined rectangular footing for the columns and sketch the details. Take bearing capacity of soil as 150 kN/m^2.   14

Unit - V

5.   Design a dog legged stair case of a residential building for the following given data: 14

   Height between floor = 3.0m

   Riser = 170mm; tread = 275mm

   Width of flight = landing width = 1.0 m

   Live load = 3.0 kN/m^2; Finishes load = 0.5 kN/m^2

   Assume the stairs to be supported on 230mm wide beams.

OR

Design a single flight slabless tread-riser staircase for span of 4.5m. Consider the tread as 300mm and riser of 200mm and width of flight as 1.2m.   rgpvonline.com   14

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