

Code No: RT31013

R13**SET - 1**

III B. Tech I Semester Supplementary Examinations, May - 2017
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

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**PART -A**

- 1 A reinforced concrete column 400 mm by 400 mm supports an axial service load of 1200 kN. The safe bearing capacity of the soil at site is 200 kN/m<sup>2</sup>. Adopting M25 grade concrete and Fe415 HYSD bars design a suitable footing for the column and sketch the details of reinforcement. [28M]
- 2 Design a continuous R.C. slab for a class room 8m wide and 16 m long. The roof is to be supported on R.C.C. beams spaced at 4m intervals. The width of beam should be kept 230 mm. The superimposed load is 3kN/m<sup>2</sup> and finishing load expected is 1.5kN/m<sup>2</sup>. Use M20 concrete and Fe415 steel. [28M]

**PART -B**

- 3 a) What is meant by characteristic strength of a material as used in IS 456 -2000? [6M]  
b) Explain the term  $M_u$  (lim) and give the expression for this value for Fe 415 steel. [8M]
- 4 A reinforced concrete beam is to be designed over an effective span of 5.5 m to support a design service live load of 6kN/m. Adopt M20 grade concrete and Fe415 HYSD bars and design the beam to satisfy the limit states of collapse of serviceability. [14M]
- 5 Design a short circular column of diameter 350 mm to support a factored axial load of 1200kN, together with a factored moment of 100kNm. Adopt M20 grade concrete and Fe415 HYSD bars. [14M]
- 6 A R.C.C beam 230mm wide and 450mm deep is reinforced with 4 NO.s of 16 mm diameter bars of grade Fe415, on the tension side with an effective cover of 50mm. If the shear reinforcement of 2 legged 8 mm stirrups at a spacing of 150 mm c/c is provided at a section, determine the design (ultimate) strength of the section. Assume M20 concrete has been used. [14M]
- 7 a) What are the types of reinforcements used to resist shear? Explain the action of different types of shear steel in resisting shear. [7M]  
b) What is meant by full development length? What is its approximate value for tension and compression in terms of the diameter of the bar? [7M]

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