

B.E. Civil Engineering (Model Curriculum) Sem-V
PCCCE506 : Design of RCC Structure-I

P. Pages : 2

Time : Four Hours



GUG/W/22/13729

Max. Marks : 80

- Notes :
1. Due credit will be given to neatness and adequate dimensions.
 2. Assume suitable data wherever necessary.
 3. Diagrams and Chemical equation should be given wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.
 5. I.S. Hand Book for structural steel section, I.S. Code 8000/1962 or 1964, I.S. 456 (Revised), I.S. 875 may be consulted.
 6. Retain all construction lines.

1. a) Define neutral axis, moment of resistance lever arm in WSM. 6
- b) Determine the moment of resistance of a singly reinforced beam 160 mm wide and 300 mm deep to the centre of reinforcement if the stresses in steel and concrete are not to exceed 140 N/mm^2 and 5 N/mm^2 (ie $\sigma_{st} = 140 \text{ N/mm}^2$ and $\sigma_{cbc} = 5 \text{ N/mm}^2$). The reinforcement consist of 4 bars of 16 mm dia. Take $M = 18$ and effective span is 5 m. 7

OR

2. a) State the limitations and assumptions in WSM. 6
- b) Calculate the moment of resistance of a singly reinforced beam by WSM. The width and effective depth are 450 mm and 715 mm. It is reinforced with 8 nos. of mild steel bars having 20 mm dia assuming M_{25} grade of concrete. 7
3. Design a singly reinforced rectangular beam for a effective span of 6 m subjected to a live load of 16 kN/m over entire span. Calculate main reinforcement and shear reinforcement. Give all necessary checks as per IS 456-2000. Draw neat reinforcement. 13

OR

4. Design the shear reinforcement for the rectangular beam 250 x 450 mm effective reinforced with 5 bars of 20 mm dia. (3 bars are straight & 2 bars are bent up). The beam is subjected to factored shear force of 250 kN. Use M_{20} grade of concrete and Fe_{415} steel. 13
5. a) Determine the ultimate moment carrying capacity of a T-beam from the following details. 7
Effective flange width = 1500 mm
Depth of flange = 120 mm
Width of rib = 250 mm
Effective depth = 450 mm
Steel consist of 4 bars of 16 mm ϕ , concrete M_{20} and Fe_{415} steel.
- b) Design RCC column having unsupported length of 4.0 m subjected to axial compressive load of 1600 kN. Use M_{20} , Fe_{415} . 7

OR

