

B.E. Civil Engineering (Model Curriculum) Sem-VII
PCC-3 / CE703 : Design of RCC Structure-II

P. Pages : 2

Time : Four Hours



GUG/W/22/14288

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.
 5. I.S. 456 (Revised), I.S. 875 may be consulted.

1. Find the moment of resistance of 'T' beam having following data. **13**
- i) Effective width of flange = 950mm
 - ii) Effective depth of beam = 530mm
 - iii) Width of beam = 230mm
 - iv) Depth of flange = 110mm
 - v) Compression reinforcement 3 nos. 25mm dia. and cover to Compression steel is 25mm
 - vi) Tension reinforcement 6 nos. 25mm dia.
 - vii) Use M20 grade of concrete and Fe415 steel.

STRAIN RELATIONSHIP STRESS FOR Fe415		
Stress Lvl.	Total Strain	Stress N/sq.mm
0.80 fyd	0.00144	288.7
0.8 fyd	0.00163	306.7
0.90 fyd	0.00192	324.8
0.95 fyd	0.00241	342.8
0.97 fyd	0.00276	351.8
1.00 fyd	0.00380	360.9

OR

2. Design a beam of the size 300mm x 700mm deep subjected to ultimate twisting moment of 900 kN-m, combined with bending moment of 260kN-m and ultimate shear force of 110kN. Assume M20 grade of concrete and Fe500 steel. **13**
3. Design a pad footing for 230mm x 350mm column carries an axial load of 500kN. **13**
SBC = 200kN / M² use M20 Concrete & Fe500 steel.

OR

4. A column is of the size 300mm x 500mm and bends in single curvature. The unsupported Length of column is 7m and effective length along major axis is 5.5m and along minor Axis is 6m. It is subjected to axial factored load of 1400kN. It is subjected to factored Moments as below, At top M_{xx}=160 kN-m At top M_{yy}=200 kN-m At bottom M_{xx}=200kN-m At bottom M_{yy}=120 kN-m Design the column using M20 concrete and Fe415 steel Sketch details. **13**
5. a) Write notes on plastic hinge and redistribution of moments. **6**

- b) A reinforced concrete fixed beam has a span of 7m and carries two concentrated loads of 70kN each from left and right support. Draw maximum bending moment envelope after 30% redistribution of moments. **8**

OR

6. A reinforced concrete fixed beam of span 6.0m is carrying an U.D.L of 12.0kN/m (Excluding self-weight) over entire span. Analyse & design the beam using 25% Redistribution of moments. Draw the reinforcement detail. Use M20 grade of concrete & Fe500 steel. **14**
7. Design a combined footing for two column A & B spaced 5.2m centre to centre column A is 230mm x 300mm in size & transmit a load of 600kN column B is (230mm x 400mm) size & carries a load of 850kN. The width of the footing is restricted to 2m only. The SBC of soil may be taken as 130 kN/m². use M20 concrete & Fe415 grade of steel. **20**

OR

8. Design a single bay frame having 4m height and 6m width for a single storey building, Take live load 2kN / M² Use M20 Concrete and Fe500 Steel. **20**
9. Design a R.C. slab for a Room measuring 4m x 6m size. The slab has two adjacent edges Discontinuous & carries a superimposed load of 2 kN/m² & F.F. of 1.0 kN/m². Use M20 & Fe500 grade of concrete & steel provide all the checks as per I.S. Code Sketch the reinforcement details. **20**

OR

10. Design a cantilever retaining wall for a road for the following data- **20**
- Height of wall from the bottom of base to the top of stem = 6m
 - Superimposed load due to traffic load = 18 kN/m²
 - Unit weight of fill = 18 kN/m³
 - Angle of internal friction for fill material = 30°
 - Allowable bearing pressure on ground = 160 kN/m²
 - Coefficient of friction between concrete & ground = 0.5 Use M20 mix concrete & Fe500 grade steel.
