

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 are compulsory.
 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.
 6. All questions carry marks as indicated.
 7. Retain the construction lines.

1. Design a beam of the size 230 mm x 700 mm deep subjected to ultimate twisting moment of 700 kN-m, combined with bending moment of 360 kN-m and ultimate shear force of 210 kN. Assume M25 grade of concrete and Fe500 steel. **13**

OR

2. Find the moment of resistance of 'T' beam having following data. **13**
- i) Effective width of flange = 750mm
 - ii) Effective depth of beam = 430mm
 - 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 Fe 415 steel.

STRAIN RELATIONSHIP STRESS FOR Fe 415		
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

3. Design a pad footing for 230mm x 450mm column carries an axial load of 600KN. **13**
SBC = 100 KN/M² use M25 Concrete & fe 500 steel.

OR

4. A column of the size 300mm x 500mm and bends in single curvature. **13**
The unsupported Length of column is 7m and effective length along major axis is 5.5 m and Along minor Axis is 6m. It is subjected to axial factored load of 1200 kN. It is subjected to Factored Moments as below, At top M_{xx} = 150 kN-m At top M_{yy} = 150 kN-m At bottom M_{xx} = 150 kN-m At bottom M_{yy} = 120 kN-m. Design the column using M20 concrete and Fe500 steel Sketch details.

5. a) Write notes on plastic hinge and redistribution of moments. **6**
- b) A reinforced concrete fixed beam has a span of 5 m and carries two concentrated loads of 70 kN 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 6.0 m is carrying an U.D.L. of 15.0 kN/m (Excluding self-weight) over entire span. Analyses & design the beam using 25% Redistribution of moments. Draw the reinforcement detail. Use M20 grade of concrete & Fe500 steel. **14**
7. Design a cantilever wall to retain earth with a backfill slope at 20° to the horizontal. The top of the wall is 5.5m. Above the ground level and foundation depth is 1.2m. Below ground level. The safe bearing capacity is 150kN/sq.m. Assume that the backfill has a unit weight of 17kN/m³ and angle of shearing resistance at 35°. Further assume coefficient of friction Between soil and concrete as 0.55. Use M20 concrete and Fe415 steel. **20**

OR

8. Design a single bay frame having 3m height and 5m width. For a single storey building, Take live load 2KN/M² Use M20 Concrete and Fe 500 Steel. **20**
9. Design a R.C. slab for a Room measuring 3m x 5m 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 combined footing for two column A & B spaced 5.2 m centre to column A is 230mm x 300mm in size & transmit a load of 600 kN column B is (230mm x 400mm) size & carries a load of 850 kN. The width of the footing is restricted to 2m only. The SBC of soil may be taken as 130 kN/m². Use M20 concrete & Fe 415 grade of steel. **20**
