

B.E. Civil Engineering (Model Curriculum) Semester-VII  
**PCC3-CE703 - Design of RCC Structures-II**

P. Pages : 2

Time : Four Hours



**GUG/S/25/14288**

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.I. Hand Book for structural steel section, I.S. Code 8000/1962 or 1964, I.S. 456 (Revised), I.S. 875 may be consulted.

1. Design a beam of the size 230 mm x 700 mm deep subjected to ultimate twisting moment of 70 kN-m, combined with bending moment of 300 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 REALTIONSHIP 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

3. Design a pad footing for 230mmx400mm column carries an axial load of 650KN. **13**  
SBC – 100KN / M<sup>2</sup> use M25 Concrete & fe 500 steel.

**OR**

4. A column of the size 230 mm x 500 mm and bends in single curvature. **13**  
The unsupported Length of column is 7.5m and effective length along major axis is 6.5 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<sub>xx</sub> = 150 kN-m At top M<sub>yy</sub> = 150 kN-m At bottom M<sub>xx</sub> = 150 kN-m At bottom M<sub>yy</sub> = 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 4 m and carries two concentrated loads of 70 kN each from left and right support. Draw maximum bending moment envelope after 23% redistribution of moments. **8**

**OR**

6. A reinforced concrete fixed beam of span 5.0 m is carrying an U.D.L. of 15.0 kN/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 cantilever wall to retain earth with a backfill slope at  $20^\circ$  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  $17\text{kN/m}^3$  and angle of shearing resistance at  $35^\circ$ . 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 4m width. For a single storey building, Take live load  $2\text{KN/M}^2$  Use M20 Concrete and Fe 500 Steel. **20**
9. Design a R.C. slab for a Room measuring 4 m x 5 m size. The slab has two adjacent edges Discontinuous & carries a superimposed load of  $2\text{ kN/m}^2$  & F.F. of  $1.0\text{ kN/m}^2$  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 3.2 m centre to centre column A is 230 mm x 350 mm in size & transmit a load of 450 kN column B is (230mm x 450mm) size & carries a load of 950 kN. The width of the footing is restricted to 2 m only. The SBC of soil may be taken as  $160\text{ kN/m}^2$ . Use M20 concrete & Fe 415 grade of steel **20**

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