B.E. Civil Engineering (Model Curriculum) Semester - VII

PCC-3-CE703 : Design of RCC Structure-II

P. Pages : 2 **GUG/S/23/14288**

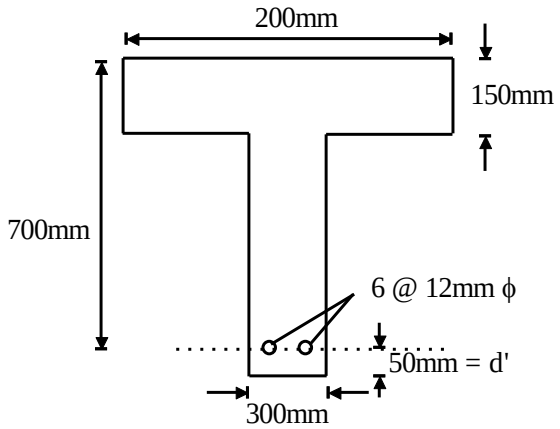
Time : Four Hours * 2 9 9 1 * Max. Marks : 80

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.

1. Design a rectangular Beam section 300mm wide & having an effective depth of 600mm. The beam is subjected to service bending moment of 200 KN.M. Use M_{25} grade of concrete & Fe415 steel sketch & Also Use effective cover 50 mm. Check for reinforcing details. **13**

OR

2. Calculate M. O. R. of beam section spanning over simply supported beam of effective span of 9m section details are as follows. [Use M_{20} grade concrete & Fe 500 steel]. **13**

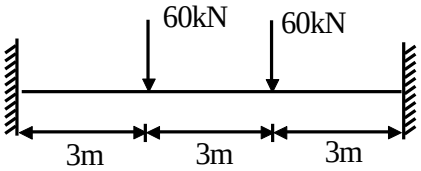


3. Design reinforcement for a spiral column of 500mm diameters subjected to 2500kN of factored load. The unsupported length of the column is 3.4m and it is braced against side way. Take M_{25} grade of concrete & Fe415 steel. **13**

OR

4. Design a isolated square footing for column of size of $450 \times 450\,mm$. Reinforced with 8 number of bar of size 25mm diameter and carrying a service load of 2500 kN. The gross safe bearing capacity of soil is $300kN/m^2$ at a depth of 1.5m, below the ground surface. Use M_{20} grade concrete & Fe415 steel for footing and M_{25} grade concrete & Fe415 steel for column. Also check the load transfer at the junction of column & footing. **13**

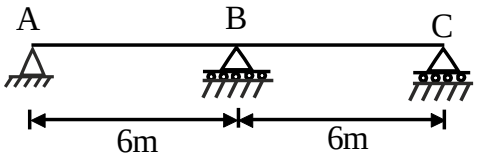
5. a) A reinforced concrete fixed beam of span 9m carries two point loads of 60kN each at one third points as shown in the fig. Draw bending moment dig. After 30% redistribution of moments. **8**



b) Write a short notes on plastic hinge & redistribution of moments. **6**

OR

6. A two span continuous beam ABC is 12 m long. It is freely supported at ends A & C and continuous over central supports 'B' at 6m. from 'A'. The beam carries a self weight of 30kN/m and characteristic live load of 46kN/m. Plot the maximum elastic moment dig. before redistribution of moment & design moment envelops after 30% redistribution of moment. Use partial F. O. S of 1.5 on load. **14**



7. Design a combined footing for two column C_1, C_2. **20**

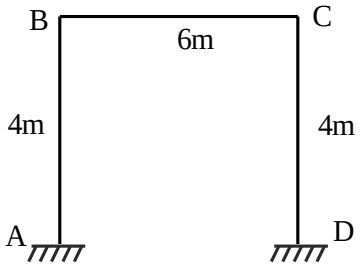
$C_1 = 400\,\text{mm} \times 400\text{mm}$; 4 @ $25\,\text{mm}\phi$ bar

$C_2 = 500\,\text{mm} \times 500\text{mm}$; 4 @ $20\,\text{mm}\phi$ bar

Supporting, axial load $p_1 = 900\,\text{kN}$ & $p_2 = 1000\text{kN}$ respectively. The column C_1 is on exterior column whose exterior face is flush with the property line. The centers to center distance between C_1 & C_2 is 4.5m. The allowable soil pressure at the base of the footing 1.5m below the ground level is 240kN/m^2. Assume Fe415 grade of steel in both footing & column and M_{20} grade of concrete in column & footing respectively.

OR

8. An intermediate frame for building is as shown in the fig. below. The framed are spaced 4m c/c The live load on the roof slab may be taken as 1600N/m^2. Design the intermediate portal frame safe bearing capacity of the soil $110\,\text{kN/m}^2$. Use M_{25} grade of concrete & Fe415 grade of steel. **20**



9. A Roof slab has a clear span of $8\text{m} \times 3\text{m}$. It is supported on all sides on a brick-wall of width 230mm. The superimposed load on the slab is 5kN/m^2 . including of floor finish. Use M_{20} grade of concrete & Fe415 grade of steel. Design the slab & show the typical Reinforcement details. **20**

OR

10. Design a cantilever retaining wall for the following data: **20**

a) Height of embankment above grd level = 4m.

b) Density of soil = 18kN/m^3.

c) Safe bearing capacity of soil = 200kN/m^2.

d) Coefficient of friction between ground & concrete = 0.5

Assume, level backfill & use M_{20} grade of concrete & Fe415 grade of steel.

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