B.E. Civil Engineering Seven Semester

CE703 - Design of RC Structures - II

P. Pages : 3 **GUG/W/18/1734**

Time : Four Hours * 1 3 6 3 * Max. Marks : 80

Notes : 1. All questions carry equal marks & 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.

1. Design a rectangular beam section 300 mm wide & having an effective width of 500 mm. The beam is subjected to ultimate torsional moment of 20 kN-m ultimate shear force of 50 kN & ultimate moment of 50 kN-m. Use M20 concrete & Fe415 steel sketch reinforcement detail. **13**

OR

2. Calculate moment of resistance of T-beam for following data : **13**

i) Width of flange = 1500 mm

ii) Depth of flange = 80 mm

iii) Depth of web = 350 mm

iv) Width of web = 300 mm

v) Area of steel in compression = 800 mm^2

vi) Area of steel in tension = 3500 mm^2

The beam is simply supported over a span of 10m. Take M20 concrete & Fe415 steel.

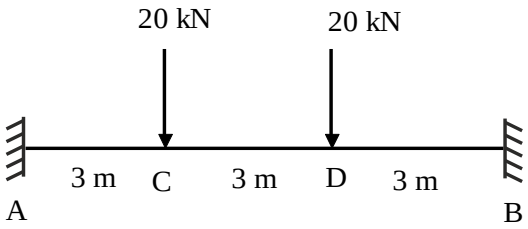
3. Design on isolated sloped rectangular footing for a column 600 x 400 mm carrying an axial load of 900 kN. The S.B.C. of soil 160 kN/m^2. Use M20 grade concrete & Fe415 steel. Sketch reinforcement details. **13**

OR

4. Design the longitudinal reinforcement for a braced column (300 x 400) mm^2 subjected to a factored axial load of 2000 kN & factored moment of 80 kN-m and 60 kN-m with respect to the major axis & minor axis respectively at the top end. Assume that the column is bent in double curvature (in both direction) with the moments at the bottom end equal to 50% of the corresponding moments at the top. Assume an unsupported length of 7.0 m and an effective length ratio of 0.85 in both direction. Use M20 concrete & Fe415 steel Assume effective cover 70 mm Assume reduction factor (k) = 0.80. **13**

5. a) Explain in short the importance of moment redistribution. **5**

b) A reinforced concrete fixed beam of span L = 9 m carries two point load (each 20 kN) at one third point as shown in figure. Draw B.M. diagram after 30% redistribution of moment. **9**



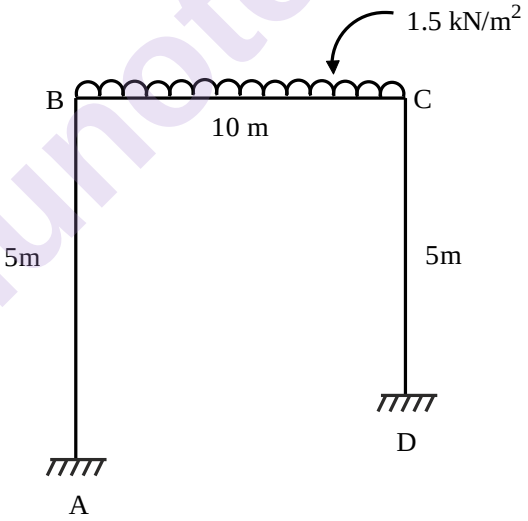
OR

6. A reinforced concrete fixed beam of span 6.0 m is carrying an U.D.L. of 12.0 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 & Fe415 steel. **14**

7. Design a combined footing for two column A & B spaced 5.2 m centre to centre column A is 300 mm x 300 mm in size & transmit a load of 600 kN column B is (400 x 400 mm^2) size & carries a load of 850 kN. The width of the footing is restricted to 2 m only. The SBC of soil may be taken as 130 kN/m^2. Use M20 concrete & Fe 412 grade of steel. **20**

OR

8. An intermediate frame provided for a building as shown in fig. the frames are spaced at 3.5 m c/c. Design the roof slab & intermediate portal frame. The live load an the roof slab may be taken as 1500 N/m^2. Use M20 grade of concrete & Fe415 grade steel safe bearing capacity of soil is 105 kN/m^2. **20**



9. Design a R.C. slab for a Room measuring 5 m x 6 m size. The slab has all four edges discontinuous with corners held down & carries a superimposed load of 2.5 kN/m^2 & F.F. of 1.0 kN/m^2 Use M25 & Fe415 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**

i) Height of wall from the bottom of base to the top of stem = 6.5 m
ii) Superimposed load due to traffic load = 18 kN/m^2.
iii) Unit weight of fill = 18 kN/m^3.
iv) Angle of internal friction for fill material = 30°.
v) Allowable bearing pressure on ground = 160 kN/m^2.
vi) Coefficient of friction between concrete & ground = 0.5

Use M20 mix concrete & Fe415 grade steel.

Chart - 6 Interaction Diagram for Combined Bending and Compression
Rectangular Section - Equal Reinforcement on All Sides.

Chart - 7 Interaction Diagram for Combined Bending and Compression
Rectangular Section - Equal Reinforcement on All Sides.

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