Reg. No. :

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The ratio of long span to short span exceeding 2 is called   CO1- R

    (a) Flat slab   (b) Two way slab   (c) One way slab   (d) None of these

2. The ratio of ultimate load to working load is   CO1- R

     (a) 2   (b) 1.5   (c) 1   (d) 3

3. The unsupported length to least lateral dimension ratio of column   CO2 -R
    with end restaints is restricted to

    (a) 30   (b) 50   (c) 60   (d) 20

4. A column is called slender if its slenderness ratio is   CO2 -R

    (a) < 12 along any axis   (b) > 12 along major axis

    (c) < 12 along both axes   (d) > 12 along major or minor axis

5. Underthe Direct Design Method in the interior span the proportion   CO3- R
    of negative design moment to total design moment is

    (a) 0.35   (b) 0.45   (c) 0.65   (d) 0.55

6. Spandrel beams are also called as   CO3- R

    (a) Edge beams   (b) Continuous Beam   (c) deep beams   (d) Flanged beam

7. The maximum value of compressive stress in concrete is reached at   CO4 -R
    a strain of about

    (a) 0.002   (b) 0.0035   (c) 0.003   (d) 0.02

8. In inelastic bending the concrete in tension between cracks provides additional capacity which may be called   CO4 -R

    (a) Tension stiffening   (b) Ductility   (c) Inelastic cracking   (d) Tensile strength

9. In ductile detailing, when a column terminates into a footing, special confining reinforcement shall extend   into the footing at least   CO5- R

    (a) 200 mm   (b) 2d   (c) L_d (d) 300 mm

10. ----------- spalling is dangerous and occurs at early stages of heating.   CO5- R

    (a) Aggregate   (b) Concrete   (c) Explosive   (d) Structure

PART – B (3 x 8= 24 Marks)
(Answer any three of the following questions)

11. Determine the area of steel required for a beam b = 300 mm,   d = 675 mm for carrying a factored moment of 185 kN m. Assume f_y = 415 N/mm^2 and f_{ck} = 20 N/mm^2. Solve the problem by   CO1- App   (8)

    (a) direct computation

12. Design R.C braced column 400x500mm with L_o= 9m, L_e = 6.75m and has 70kN-m and 10 kN-m as ultimate moments $My_{(top)}$ and $My_{(bottom)}$ respectively. The axial ultimate load is 2000 kN. If the column is bent in double curvature, determine the design moments (YY is the minor axis). Adopt M_{40} and Fe_{415} grades.   CO2- Ana   (8)

13. A flat plate with 7.5 m x 6 m panels on 500 x 500 mm columns has a slab thickness of 185 mm, designed for a total characteristic load (DL + LL) of 9.3 kN/m2. Check the safety of the slab in shear if grade 25 concrete and grade 415 steel are used for its construction. How can we increase the shear capacity of the slab?   CO3-App   (8)

14. Determine the salient points on the stress – strain curve of concrete in bending of a unconfined concrete member if cylinder strength of concrete used $f_c^{'}$ is 25 N/mm^2. If such a concrete is confined in a section of breadth 300mm, total depth 500mm and clear cover of 50mm with 10mm (78 mm^2) stirrups at 100mm centers, determine the stress – strain curve for inelastic analysis of the structures. Use the relation $f_c^{'} = 0.8 f_{ck}$.   CO4 -App   (8)

15. In a multi-storeyed RC frame building located at Chennai, a typical column of 3.4m clear height carries an axial load of 3500 kN and a bending moment of 780kN-m under gravity and seismic load conditions. Design the column section with adequate ductility. Assume M25 grade of concrete and Fe415 grade of steel.   CO5-App   (8)

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