Reg. No. :

Question Paper Code: 51U02

M.E. DEGREE EXAMINATION, DEC 2020

First Semester

Structural Engineering

15PSE102 - CONCRETE STRUCTURES

(Regulation 2015)

(IS456-2000, IS875 (1-5) 1987, SP (16) - 1980 and IS13920- 1993 are permitted)

Duration: 1.15 hrs   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

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

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

2. 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

3. For a RC wall, minimum vertical reinforcement is   CO2 -R

    (a) 0.4%   (b) 0.12%   (c) 0.15%   (d) 0.8%

4. 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

5. Spandrel beams are also called as   CO3- R

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

6. 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

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. ------ diagram of an under reinforced beam to a bilinear curve   CO4 -R

    (a) Moment – Rotation   (b) Moment – Curvature

    (c) Stress – Strain   (d) Curvature

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

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

10. The thickness of shear walls shall not be less than ----------

    (a) 200 mm   (b) 250mm   (c) 180mm   (d) 150mm

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PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

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11. Design a one-way slab with a clear span of 4 m simply supported on 230   CO1- App   (8)
    mm thick masonry walls and subjected to a live load of   4
    kN/m2 and a surface finish of 1 kN/m2. Assume M15 concrete and Fe415
    steel.

12. Design a suitable RC section of a column of effective height 2.85 m to   CO2- Ana   (8)
    resist a factored axial load of 250 kN along with factored moments of 35
    kNm about both major and minor axes. The effective cover is 40 mm on
    all four sides. Use M20 and Fe 415.

13. Design a rectangular slab 5 m x 4 m in size and simply supported at the   CO3-App   (8)
    edges to support a service load of 4 kN/m^2. Assume coefficient of
    orthotropy as 0.7. Adopt M 20 concrete and Fe 415 steel.

14. An RC slab is 105 mm thick with 20 mm cover to center to centre of   CO4 -App   (8)
    steel. If the positive steel reinforcement is 424 mm^2/m determine the
    ductility factor assuming M 25 concrete and Fe250 steel.

15. In a multi-storeyed RC frame building located at Chennai, a typical   CO5-App   (8)
    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.

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