

Register No.:

486

April 2024

Time - Three hours
(Maximum Marks: 100)

- [N.B. 1. Answer all questions under Part-A. Each question carries 3 marks.
2. Answer all the questions either (A) or (B) in Part-B. Each question carries 14 marks.]

PART - A

1. What is Reinforced Cement Concrete?
2. Differentiate singly reinforced and doubly reinforced beams.
3. Write down the classification of slabs.
4. What is torsional reinforcement in slab?
5. What is the code provision for design strength of different types of shear reinforcement?
6. List out the components of stairs.
7. What are the assumptions made in limit state of collapse in compression member?
8. What is meant by development length?
9. Define tension members.
10. Define slenderness ratio.

PART - B

11. (a) A Rectangular R.C.C beam of M20 grade concrete is 280mm wide and 500 mm deep effective. It is reinforced with 4 numbers of 16mm diameter Fe 415 grade reinforcement bars in the tension zone. Calculate the moment of resistance of the section at the limit state of collapse.
(Or)
(b) A simply supported singly reinforced rectangular beam is to be provided over a clear span 6m, to carry an udl of 24kN/m (exclusive of its self-weight). The size of the brick pillars supporting the beam is 300x300mm. Design the mid span section of the beam using M 25 grade concrete & Fe 415 grade steels by Limit State Method.

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12. (a) Design the roof slab of a reading room of clear dimensions 4m x 10m. Access is provided to the roof. Width of support is 230mm. A weathering course load of 2kN/m^2 is to be provided over the slab. Use M20 grade concrete and Fe500 grade steel. Assume suitable data if any.

(Or)

- (b) Design a simply supported roof for a room of clear size 3m x 5m. The thickness of walls all-round is 230 mm. Access is provided to the roof. The corners of the slabs are not held down. Weight of weathering course will be 1.2 kN/m^2 concrete grade M25 and steel grade Fe 415 is to be used. Assume suitable data if any.

13. (a) A simply supported rectangular beam of 230 x 450 mm effective size carries a total characteristic load (Dead load + imposed load) of 100 kN. The percentage of tension steel at the support section is found to be 0.768. The beam is of M20 grade concrete. Design the shear reinforcement using mild steel bars by limit state method.

(Or)

- (b) Explain the classification of staircases with neat sketch.

14. (a) A R.C column of 300 mm x 500 mm size has to carry an axial load of 1000kN. M20 grade concrete and Fe 415 grade steel are to be used in the column. Fe 250 grade steel bars may be used for transverse reinforcement for the column. Assuming it as a short column. Design the column by limit state method.

(Or)

- (b) Explain the detailed procedure for design of isolated footing.

15. (a) A laterally restrained simple beam has to resist a maximum bending moment of 185 kNm. The yield strength of the steel is 250 N/mm^2 . Choose a suitable I – section for the beam.

(Or)

- (b) Explain the detailed procedure for design of steel column member by limit state method.
