

Total No. of Questions : 6]

SEAT No. :

PA-10032

[6009]- 314

[Total No. of Pages : 2

T.E. (Civil Engineering) (Insem)

DESIGN OF REINFORCED CONCRETE STRUCTURES

(2019 Pattern) (Semester - II) (301013)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q4, Q.5 or Q.6.
- 2) Figures to the right indicate full marks.
- 3) Use of IS 456-2000 and non programmable calculator is allowed.
- 4) Neat diagrams must be drawn wherever necessary.
- 5) Mere reproduction from IS Code as answer, will not be given full credit.
- 6) Assume any other data, if necessary.

Q1) a) Calculate neutral axis, lever arm and moment of resistance factor for M25 and Fe 550. [4]

b) Calculate moment of resistance for a section 300mm × 450mm deep. 3 bars of 20mm diameter provided on tension side only. Effective cover is 40mm, use M30 and FE 415. [6]

OR

Q2) a) Explain the terms bond stress and development length. Calculate development length for 20mm diameter bar of grade Fe500 and M30 grade of concrete in tension and compression using LSM. [4]

b) Explain with neat sketch Balanced, Under reinforced and Over reinforced section as per LSM. [6]

Q3) a) Enlist essential conditions to design beam section as flanged beam in floor beam system. [2]

b) Design a cantilever RC slab for an effective span of 1.5 m carrying live load of 3 kN/m² and floor finish of 1 kN/m². Use M20 grade of concrete and Fe 415 grade of steel. [8]

OR

P.T.O.

- Q4)** a) Explain Characteristic strength and Partial factor of safety. [2]
- b) Design a simply supported one way slab for a room with clear inner size $3.5\text{m} \times 7.8\text{m}$. The slab is supported by beams of width 230mm along all the edges. The slab is subjected to floor finish of 1.5 kN/m^2 and live load 3 kN/m^2 . Use concrete of grade M20 and Fe500 reinforcement. Draw details of reinforcement. [8]

- Q5)** Design a simply supported two-way slab panel having effective dimensions as $4.23\text{ m} \times 3.23\text{ m}$. Take live load of 3.50 kN/m^2 and floor finish of 1 kN/m^2 . Use M20 grade of concrete and Fe 415 grade of steel. (Neglect design of distribution steel and check for shera) [10]

OR

- Q6)** Design of continuous two way slab of effective size $3.5\text{ m} \times 5\text{ m}$ of a typing floor for an office building. The live load and floor finish are 3.0 kN/m^2 and 1.5 kN/m^2 , respectively. The slab is discontinuous at two adjacent edges. Use M25 grade of concrete and Fe 500. (Neglect design of distribution steel, torsion reinforcement and check for shear). [10]