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BAR-044

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

December, 2018

00373

BAR-044 : THEORY OF STRUCTURES – V

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any* ***four*** *questions. All questions carry equal marks. Use of calculator and IS : 456 code is permitted.*

1. Determine the area of tensile steel reinforcement required for a singly reinforced beam section of size 300 × 550 mm (effective depth) to carry a factored moment of 175 kNm. Take M 20 grade concrete and Fe 415 grade steel. $17\frac{1}{2}$

2. A reinforced concrete beam of rectangular cross-section of 300 mm width and 550 mm overall depth is reinforced with 6 bars of 20 mm diameter Fe 415 grade steel, placed at an effective cover of 50 mm. Design the shear reinforcement if the beam is subjected to a uniformly distributed factored load of 100 kN/m over a simply supported clear span of 7 m. The concrete is of M 20 grade. $17\frac{1}{2}$

3. A reinforced concrete rectangular column is of unsupported length of 3 m and is to be designed for a factored axial load of 2500 kN. One cross-section dimension of column is 550 mm. Design the column for M 20 concrete and Fe 415 grade reinforcement. $17\frac{1}{2}$

4. Describe the procedure of design of an isolated concrete rectangular footing for a rectangular column. Draw plan and elevation and show critical sections to be checked for safety. Draw a typical reinforcement detailing pattern for such a case. $17\frac{1}{2}$

5. Design floor slab for an interior room with clear dimensions of $4 \times 8{\cdot}5$ m. The slab is supported on 230 mm thick walls. Take a live load of 4 kN/m^2 and dead load of finish as $1{\cdot}5$ kN/m^2. Use M 25 grade concrete and Fe 415 grade steel. $17\frac{1}{2}$

6. (a) Discuss the important features of an earthquake resistant masonry building. $10\frac{1}{2}$

   (b) Why is simple and regular plan considered best for resisting earthquake forces ? 7

7. Write short notes on the following :

(a) Two-way shear in footing 6

(b) Bond strength and its significance 6

(c) Over-reinforced section and under-reinforced section $5\frac{1}{2}$