

BACHELOR OF ARCHITECTURE (B.Arch.)

Term-End Examination

December, 2017

00352

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. Design a rectangular reinforced concrete beam of 375 mm width and 500 mm total depth which is subjected to a factored moment of 300 kNm. Consider M 25 concrete and Fe 415 steel with 50 mm effective cover.

$17\frac{1}{2}$

2. Determine shear reinforcement in a rectangular beam cross-section of 250 mm width and 450 mm effective depth. It is subjected to a shear force of 100 kN and has been provided with 4 – 20 ϕ Fe 415 reinforcement bars. Shear reinforcement in the form of two-legged vertical rings (stirrups) of 6 ϕ of Fe 250 steel is to be provided.

$17\frac{1}{2}$

3. (a) Differentiate between singly reinforced concrete beam section and doubly reinforced concrete beam section. $5\frac{1}{2}$
- (b) Classify one-way slab and two-way slab. 6
- (c) Classify different types of RCC columns. 6
4. Design a roof slab simply supported on all its four edges of effective span $3\text{ m} \times 7\text{ m}$. The top of the slab is covered with 100 mm thick lime concrete. Imposed load may be taken as 1.5 kN/m^2 . Take M 20 concrete and Fe 415 steel. $17\frac{1}{2}$
5. Design a rectangular footing for a column of size $300\text{ mm} \times 400\text{ mm}$ subjected to axial load of 1000 kN. Safe bearing capacity of soil is 250 kN/m^2 . Consider M 25 grade concrete, Fe 415 steel and nominal cover of 50 mm. $17\frac{1}{2}$
6. (a) What is Shear Wall ? How is it helpful in making the structure earthquake resistant ? 10
- (b) "Ductility is one of the important requirements for an earthquake resistant structure." Discuss the method for making a structure ductile. $7\frac{1}{2}$



7. Write short notes on the following topics :

- (a) Effect of Quality of Water on Concrete Quality 6
- (b) Buckling of Columns 6
- (c) Limit State Method of Reinforced Concrete Design $5\frac{1}{2}$
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