Hall Ticket No | | | | | | | | | | |

Question Paper Code: ACEC16

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech V SEMESTER END EXAMINATIONS (REGULAR/ SUPPLEMENTARY) - FEBRUARY 2024
Regulation: UG20

REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING

Time: 3 Hours **(CIVIL ENGINEERING)** **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Discuss the following methods of design of concrete structures.
   i) Working stress method
   ii) Limit state method. [BL: Understand| CO: 1|Marks: 7]

   (b) A RC beam having rectangular cross section 300 mm width and reinforced with four bars of 25 mm diameter having an effective depth of 550 mm. Determine stress developed in steel and concrete under working stress method. [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) What are the various remedial measures for control of cracking? Discuss the different regions of cracks in the beam. [BL: Understand| CO: 2|Marks: 7]

   (b) A rectangular beam is having breadth 350 mm and depth 550 mm having factored shear force of 400 kN at critical section. Four numbers of 32 mm diameter bars are provided at tension side and assume suitable data's needed. Design vertical stirrups for the section. [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) Elaborate the types of slabs used in construction of a building. Discuss the design procedure for one way slab. [BL: Understand| CO: 3|Marks: 7]

   (b) Design a simply supported one way slab of size 3m x 4m. Use M20 grade of concrete and Fe415 steel. Adopt live load of 3 kN/m^2. Assume required data. [BL: Apply| CO: 3|Marks: 7]

4. (a) Differentiate between one-way and two-way slabs. Explain the step by step procedure involved in design of a slab. [BL: Understand| CO: 4|Marks: 7]

   (b) Design a simply supported roof slab (4x4) m inner dimensions with 230 mm wall supports. Adopt live load of 4 kN/m^2 and floor finish of 1 kN/m^2. Assume suitable data's required. [BL: Apply| CO: 4|Marks: 7]

MODULE – IV

5. (a) Classify types of columns based on type of loading. Outline the procedure for design of axially loaded reinforced concrete column. [BL: Understand| CO: 5|Marks: 7]

(b) Design a circular column of diameter 400 mm with helical reinforcement subjected to working load of 1200kN. Column is effectively held in position at both ends but not restrained against rotation. The unsupported length of column is 3 m. Assume suitable data required.
[BL: Apply| CO: 5|Marks: 7]

6. (a) Develop the steps involved in design of a column. Differentiate between behavior of a short and long column. [BL: Understand| CO: 5|Marks: 7]

(b) Design a rectangular column to carry an axial load of 1500kN. Effective length of column is 3.1m. Assume suitable data's required. [BL: Apply| CO: 5|Marks: 7]

MODULE – V

7. (a) Discuss the load transfer mechanism in footings. Explain the design procedure for isolated footing of uniform depth. [BL: Understand| CO: 6|Marks: 7]

(b) A square footing has to carry a dead load of 900kN and an imposed load of 500kN for a square column of size 400 mm. Safe bearing capacity of soil is 200kN/m^2. Use M20 grade of concrete and Fe415 steel to design a square footing. [BL: Apply| CO: 6|Marks: 7]

8. (a) What are the different types of stair case. Discuss the procedure for estimation of dead weight of stairs. [BL: Understand| CO: 6|Marks: 7]

(b) Classify different types of foundations. List out the IS recommendations regarding longitudinal reinforcements. [BL: Understand| CO: 6|Marks: 7]

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