

BACHELOR OF ENGINEERING(CIVIL ENGINEERING)

3rd year-1st semester-2019

Design of Structures I

Time – 3 hour

Full marks – 100

Figures in the margin indicates marks

Part I (50 marks)

IS 456 and SP16 codes are allowed in the examination hall

Assume reasonable values of any data, if required

1. Design a RCC slab panel 4.2m x 5.2m (Two adjacent edges discontinuous and two other edges continuous) against a live load of 3 KN/m². Grade of concrete M20 and Grade of steel Fe415. Calculate the maximum deflection. Apply Limit State method of design as per IS456. $\gamma_L=1.5$. 20

OR

Design a RCC slab panel 4.75m x 6m (Three edges discontinuous and one long edge continuous) against a live load of 4 KN/m². Grade of concrete M20 and Grade of steel Fe415. Calculate the maximum deflection. Apply Limit State method of design as per IS456. $\gamma_L=1.5$. 20

2. (a) Design a short square column with a square isolated RCC footing against an axial compressive load of 1200 KN. Grade of concrete M20 and Grade of steel Fe415. Safe capacity of soil = 120 KN/m². Apply Limit State method of design as per IS456. $\gamma_L=1.5$. 20

OR

Design a short square column with a square isolated RCC footing against an axial compressive load of 1800 KN. Grade of concrete M20 and Grade of steel Fe415. Safe capacity of soil = 160 KN/m². Apply Limit State method of design as per IS456. $\gamma_L=1.5$. 20

- (b) Design a RCC short column against an axial compressive load of 2000 KN and moments $M_x = 150$ KN-m and $M_y=125$ KN-m. Grade of concrete M25 and Grade of steel Fe415. $\gamma_L=1.5$. Apply Limit State method of design as per IS456. 10

OR

Design a RCC short column against an axial compressive load of 2000 KN and moments $M_x = 150$ KN-m and $M_y=125$ KN-m. Grade of concrete M25 and Grade of steel Fe415. $\gamma_L=1.2$. Apply Limit State method of design as per IS456 10

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THIRD YEAR, 1ST SEMESTER 2019
DESIGN OF STRUCTURES-I

Time : 3 hours

Full Marks : 100

PART-II (50marks)

(use separate answer script for each part)

The figures in the margin indicate full marks

Assume reasonable value of any data if required,
IS code No. 456 & SP 16 are allowed in examination hall

Answer any two question

1. Design the reinforcement for a T-beam with following data :

Flange width 2343 mm, flange thickness 130 mm, width of rib 250 mm, total depth 650 mm and effective cover 50 mm to cater an ultimate bending moment of 540 KN-M. Consider grade of concrete M20 and grade of steel Fe415. Apply 'Limit State Method' as per IS 456. Draw detail arrangement of reinforcements.

25

2. Design a continuous beam of four equal spans of 5.5 m each which carries an uniformly distributed dead load (including self-weight) 30 KN/M and uniformly distributed live load 5 KN/M. Consider grade of concrete M25 and grade of steel Fe415. Width of beam to be considered as 250mm. IS code coefficient for bending moment and shear force to be used. Apply 'Limit State Method' as per IS 456. Draw detail arrangement of reinforcements.

25

3. Design a dog legged stair with following data:

- Stair width 1.2m
- Width of landing 1.5m
- Floor to floor height 3.3m
- Riser 150mm
- Tread 270mm
- Floor finish 1KN/sqm
- Live load 3 KN/sqm
- Consider grade of concrete M25 and grade of steel Fe415
- Apply 'Limit State Method' as per IS 456
- Draw detail arrangement of reinforcements.

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