

[illegible]

B.Tech (Civil) (Sem.-5)
DESIGN OF CONCRETE STRUCTURE I
Subject Code : CE-319
Paper ID : [A0615]

Max. Marks : 60

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q1. Answer briefly :

- a) What is a balanced section according to the working stress theory?
- b) Write about partial safety factors in the limit state method of RC design.
- c) List circumstances under which doubly beam is required.
- d) What is the minimum eccentricity to be considered in the design of short columns?
- e) Name the two types into which the slab types of stair case can be broadly divided into?
- f) What is the difference between lap length and anchorage length?
- g) What is the codal recommendation of torsion steel in two-way slab?
- h) What do you mean by flexural shear cracks?
- i) What is meant by modular ratio?
- j) Write the equation for nominal shear reinforcement.

SECTION-B

- Q2. Write down the steps for solving the design type of problem of singly reinforced rectangular beams.
- Q3. Calculate the moment of resistance of a singly reinforced concrete beam having 300mm width and 400mm effective depth. It is reinforced with 3 bars of 12mm diameter. M20 concrete and Fe 415 steel are used.
- Q4. Mention the difference in design principles for L Beam and T Beam.
- Q5. Determine the minimum effective depth required and the corresponding area of tension reinforcement for a rectangular beam having a width of 200mm to resist an ultimate moment of 200 kNm, using M20 concrete and Fe 415 HYSD bars.
- Q6. How to determine the design shear strength of concrete in slabs of different depths having the same percentage of reinforcement?

SECTION-C

- Q7. Determine the ultimate moment carrying capacity of the T beam. Given: $b_f = 800\text{mm}$, $D_f = 150\text{mm}$, $b_w = 300\text{mm}$, $d = 420\text{mm}$, $A_{st} = 5$ nos. of 20 mm dia bars on tension side. Assume Fe 415 steel and M20 concrete. Also compute the maximum stresses in steel and concrete if it is subjected to a design moment of 100 kNm.
- Q8. Design a two way slab for a room $5.5\text{m} \times 4.0\text{m}$ clear in size if the superimposed load is 5 KN/m^2 . Use M20 concrete and Fe 415 steel. Corners are not held down.
- Q9. Design one of the flights of a dog-legged stairs spanning between landing beams using the following data. Type of stair case: dog legged with waist slab, treads and risers. No. of steps in the flight = 10, Tread $T = 300\text{mm}$, Rise $R = 150\text{ mm}$ width of landing beams = 300mm, Use M20 concrete and Fe 415 steel.