

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

B.Tech-V Semester (CE)

COURSE CODE (CREDITS): 18B11CE515(4)

MAX. MARKS: 35

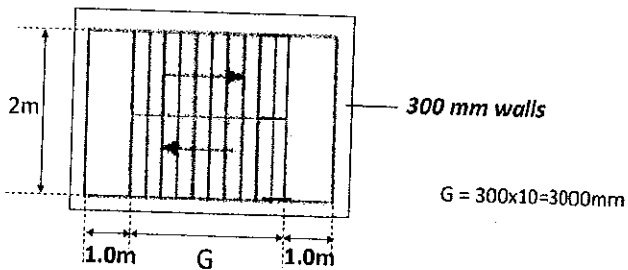
COURSE NAME: Design of Concrete Structures

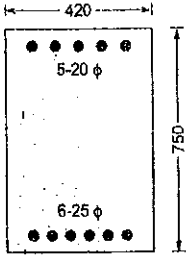
COURSE INSTRUCTORS: Dr. Tanmay Gupta

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems. IS 456:2000 is allowed

Q.No	Question	CO	Marks
Q1	<p>Design the waist-slab type of the staircase shown in figure below. Both Landing slabs and waist slabs are supported on beams and are spanning longitudinally. The finish loads and live loads are 1 kN/m^2 and 5 kN/m^2, respectively. Use riser $R = 150 \text{ mm}$, trade $T = 300 \text{ mm}$, concrete grade = M 20 and steel grade = Fe 415.</p> 	4	8
Q2	<p>Draw four typical strain profiles of a short, rectangular and symmetrically reinforced concrete column causing collapse subjected to different pairs of P_u and M_u when the depths of the neutral axis are (i) less than the depth of column D, (ii) equal to the depth of column D, (iii) $D < kD < \infty$ and (iv) $kD = \infty$. Explain the behaviour of column for each of the four strain profiles ?</p>	2	4
Q3	<p>Determine the areas of steel, bar diameters and spacings in the two directions of a simply supported slab of effective spans $3.5 \text{ m} \times 8 \text{ m}$ subjected to live loads of 4 kN/m^2 and the load of floor finish is 1 kN/m^2. Use M 20 and Fe 415 with support width 120 mm. Draw the diagram showing the detailing of reinforcement.</p>	2	8
Q4	<p>Explain the situations when do you provide longitudinal tension, compression and side face reinforcement in beam subjected to bending moment, shear and torsional moment?</p>	5	3
Q5	<p>What are the three different ways to provide shear reinforcement? Explain the method of design of each of them.</p>	3	3

Q6	Draw stress-strain curve of steel bars with or without definite yield point and indicate the yield stress f_y of them. Also indicate design yield stress and differentiate it from yield stress.	1	4
Q7	<p>Calculate the moment of resistance of a doubly reinforced beam section of size 420X750mm. Reinforcement provided on tension side is 6nos. 25mm dia bars and on the compression side is 5 nos. of 20mm dia bars. Use M25 concrete and Fe500 steel, f_{sc} may be taken as 402 N/mm²</p> 	2	5