JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

B.Tech-VIII 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)Marks are indicated against each question in square brackets. (c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems. Use of IS 456 is allowed.

Q.1 Draw four typical strain profiles of a short, rectangular and symmetricallyreinforced 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< ∞ and (iv) kD = ∞. Explain the behaviour of column for each of the four strain profiles.   **[6]**

Q.2 Draw a typical interaction diagram and explain the three zonesrepresenting three modes of failure of a short, rectangular and symmetrically reinforced concrete column subjected to axial load P_u and uniaxial moment M_u.   **[4]**

Q.3 Design the staircase shown below if supported on beams along KQ and LR only making both the landings A and B as cantilevers. Use the finish loads = 1 kN/m^2, live loads = 5 kN/m^2, riser R = 160 mm, trade T = 270 mm, grade of concrete = M 20 and grade of steel = Fe 415.**[8]**
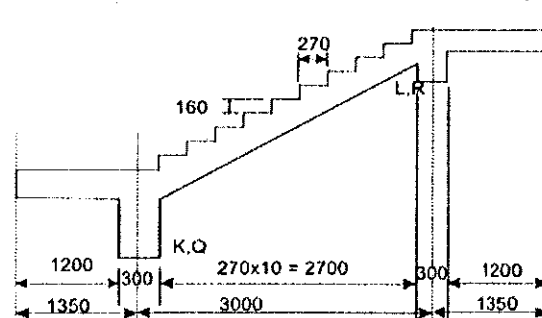
Q.4 Design the cantilever panel of the one-way slab shown below subjected to uniformly distributed imposed loads 5 kN/m^2 using M 20 and Fe 415. The load of floor finish is 0.75 kN/m^2. The span dimensions shown in the figure are effective spans. The width of the support is 300 mm.   **[8]**

A | B | C | D | E | 6500

|← 3000 →|← 3000 →|← 3000 →|← 850 →|
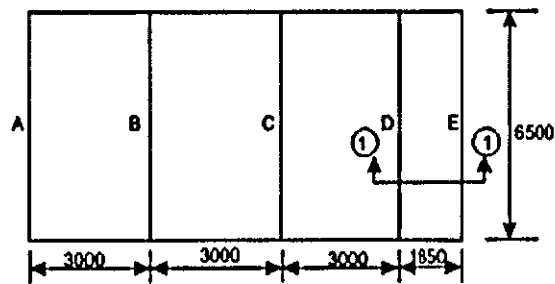
Q.5 What are the three different ways to provide shear reinforcement? Explain the method of design of each of them. **[3]**

Q.6 Draw cross-section of a beam with top slab and show the actual width and effective width of the T-beam.Write the expressions of effective widths of T and L-beams and isolated beams.**[3]**

Q.7 State the two types of problems of doubly reinforced beams specifying the given data and the values to be determined in the two types of problems.Also write down the steps of the solution by the two methods of each of the twotypes of problems. **[3]**