

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS-2022

B.TECH-V SEMESTER CIVIL

COURSE CODE (CREDITS): 18B11CE515

MAX. MARKS: 25

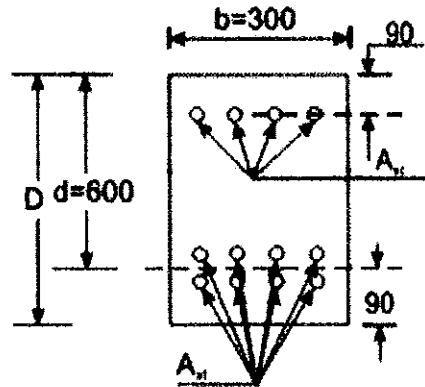
COURSE NAME: DESIGN OF CONCRETE STRUCTURES

COURSE INSTRUCTORS: Dr. TANMAY GUPTA

MAX. TIME: 1 Hour and 30 Minutes

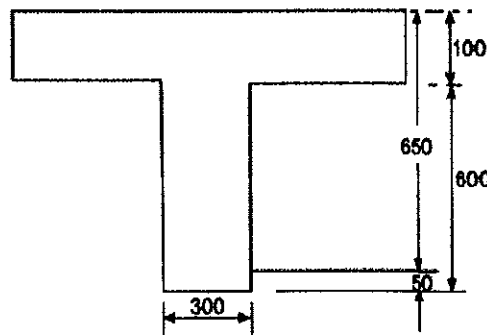
Note: All questions are compulsory. Marks are indicated against each question in square brackets. Utilization of code IS 456 is allowed.

Q.1 Determine the moment of resistance of the doubly reinforced rectangular beam shown below with $b = 300$ mm, $d = 600$ mm, $d' = 90$ mm, $f_{ck} = 30$ N/mm², $f_y = 500$ N/mm², $A_{sc} = (2-32 T + 2-20 T)$, and $A_{st} = (4-32 T + 4-16 T)$. 4 [CO2]



Q.2 Explain the four different cases of flanged beams with neat sketches. 4 [CO2]

Q.3 Determine the steel reinforcement A_{st} of the simply supported flanged beam having $D_f = 100$ mm, $D = 700$ mm, cover = 50 mm, $d = 650$ mm, $b_w = 300$ mm, spacing of the beams = 4,000 mm c/c, effective span = 12 m and imposed loads = 10 kN/m². Use M 20 and Fe 415. 5 [CO2]



Q.4 How do we design the shear reinforcement close to the support of a beam? 2 [CO3]

Q.5 Design the main tensile reinforcement of a singly reinforced rectangular beam of width 300 mm and effective span of 8 m carrying a total factored load of 40 kN/m using M 20 and Fe 415. Check the development length at the support if 50 per cent of the reinforcing bars are continued to the support. Assume width of the support as 300 mm. **4 [CO3]**

Q.6 The T beam shown in the figure is subjected to following factored loads. Bending Moment of 215kNm, Shear of 150kN and Torsion of 105kNm. Assuming M30 and Fe 415, with cover to center of steel as 50 mm, design the reinforcements according to IS 456. **6 [CO5]**

