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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2026

M.Tech-II Semester (SE)

COURSE CODE (CREDITS): 25M11CE214 (3)

MAX. MARKS: 25

COURSE NAME: PRESTRESSED CONCRETE DESIGN

COURSE INSTRUCTORS: DR. SAURAV

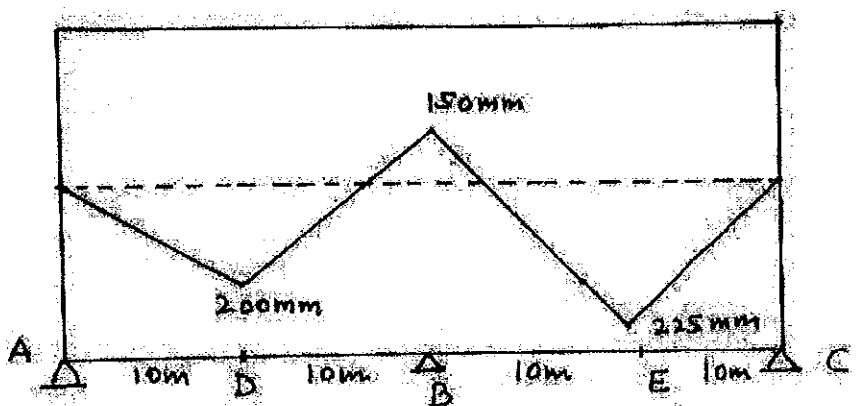
MAX. TIME: 1 Hour 30

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of Non programmable calculator is allowed.

Q.No	Question	CO	Marks
Q1	A rectangular concrete beam of size 150mm×300mm is simply supported over a span of 8m and is prestressed by means of a symmetric parabolic cable at a distance of 75mm from the bottom of the beam at mid span and 125mm from the top of the beam at support sections. If the force in the cable is 350kN and the modulus of elasticity is 38kN/mm ² , calculate i. The deflection at mid span when the beam is supporting its own weight. ii. The concentrated load which must be applied at mid span to restore it to the level of supports	4	4
Q2	Develop an equation to calculate the short-term deflection of a prestressed beam due solely to prestressing, for a tendon profile comprising parabolic segments of length l_1 near the supports and a straight segment of length l_2 toward midspan, with eccentricity varying from zero at supports to e at midspan.	4	4
Q3.	Design a post-tensioned prestressed concrete beam of 300 mm width and 15 m span to safely carry a live load of 25 kN/m, using a straight prestressing cable. Consider prestress losses of 15% and ensure that the permissible stresses of 15 N/mm ² in compression and zero tension are satisfied.	4	5
Q4.	A post tension Prestressed concrete beam is tensioned initially by a prestressing force of 1458 kN transferred at 28 days, strength of concrete. The cable is parabolic with $e = 520$ mm at the Centre. Use the following data $A = 2.42 \times 10^5 \text{ mm}^2$, $I = 5.3 \times 10^{10} \text{ mm}^4$, $A_T = 1385 \text{ mm}^2$ F_s at transfer = 1059 N/ mm ² , $E_s = 2.1 \times 10^5 \text{ N/ mm}^2$, $E_c = 0.382 \times 10^5 \text{ N/ mm}^2$ Friction coefficient = 0.25 , Wobble correction factor = 0.0015 per meter	3	5

	Anchorage loss = 2.5 mm. Calculate all type of losses if span is equal to 16 m.		
Q5.	The cable profile for a two span continuous beam is shown in the Fig 1. The prestressing force is 1200kN. Locate the pressure line due to the prestressing force alone.  Fig. 1	5	7

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