JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

M.Tech-II Semester (SE)

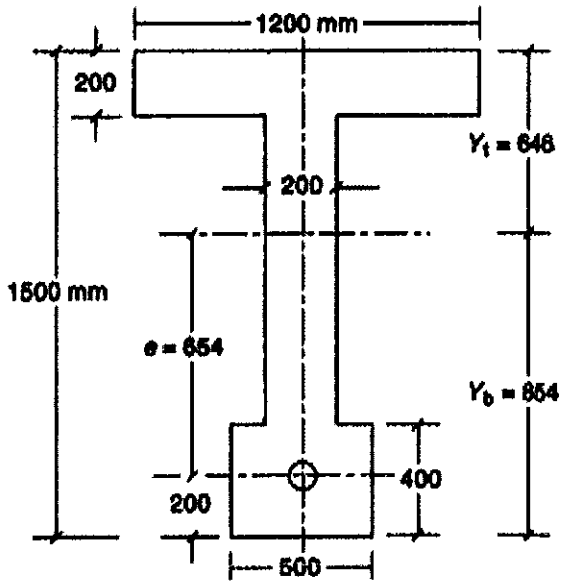
COURSE CODE (CREDITS): 12M1WCE231 (3) MAX. MARKS: 15

COURSE NAME: PRESTRESSED CONCRETE DESIGN

COURSE INSTRUCTORS: DR. SAURAV MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*

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

Q.No	Question	CO	Marks
Q1	A prestressed concrete bridge deck comprises unsymmetrical I-section beams spanning over 20 m. The cross-section of a typical beam is shown in **Fig 1**. The beam is prestressed by seven Freyssinet cables, each carrying an effective force of 600 kN located 200 mm from the soffit at the centre of span section. If the total maximum bending moment at the centre of span of the girder is 3600 kN m. Estimate the resultant stress developed at the section using strength concept method.  **Fig. 1**	2	5
Q2	A rectangular concrete beam of cross section 120 mm wide and 300 mm deep is prestressed by a straight cable carrying an effective force of 180 kN at an eccentricity of 50 mm. The beam supports an imposed load of 3.14 kN/m over a span of 6 m. If the	2	4

	modulus of rupture of concrete is 5 N/mm^2, evaluate the load factor against cracking assuming the self-weight of concrete as 24 kN/m^3		
Q3.	i) Explain the difference between load carrying mechanism of Reinforced and Prestressed concrete beam sections with sketches. ii) A concrete beam supports three concentrated loads equally spaced on the simply supported span. Suggest a suitable cable profile to counteract the effect of these live loads. iii) Explain with sketches Prestressed concrete beam section has improved resistance to shearing force when compared to conventional RCC	1	6