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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

M.Tech-1st Semester (CE)

COURSE CODE (CREDITS): 25M1WCE114 (3) MAX. MARKS: 15

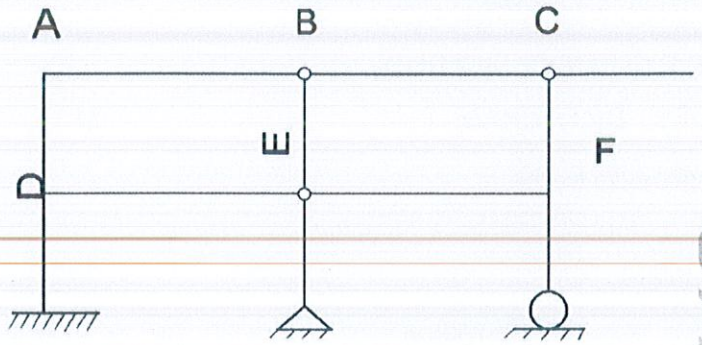
COURSE NAME: FINITE ELEMENT METHOD

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 uniform bar with length L and cross-sectional area A is fixed at the top and suspended vertically from a roof. A point load P is applied at the free (lower) end. Using the Rayleigh-Ritz method, determine the stress at any cross-section along the length of the bar. Given: $E=2\times10^5$ N/mm^2, L=10m, and a cylindrical specimen of diameter 20 mm, compute the stress and strain at the mid-span when subjected to a load P=50kN.	1	5
Q2	A uniform beam fixed at both ends carries a central concentrated load P. Find the central deflection due this loading condition assuming the trail function as $y = y_0 [1 - \cos(2\pi x / L)]$ Where y_0= Ritz parameter. L= length of the beam	1	3
Q3.	What do you understand by degree of freedom? Deduce an equation to formulate stiffness matrix in member coordinate system for space frame member having 2 nodes.	2	5

Q4.	Find the degree of kinematic indeterminacy and represent all displacement components in the Fig. below. Joint B, C and E are hybrid joints 	2	2