JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

M.Tech-II Semester (SE)

COURSE CODE (CREDITS): 25M1WCE213 (3) MAX. MARKS: 15

COURSE NAME: THEORY OF PLATES AND SHELLS

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

(c) Use of Non programmable calculator is allowed.

Q.No	Question	CO	Marks
Q1	Analyze the governing differential equation of thin plate bending and, clearly stating all assumptions of classical plate theory, derive Navier's general solution for the lateral deflection of a simply supported rectangular plate of dimensions $(a \times b)$ subjected to an arbitrary transverse load $q(x,y)$, and hence obtain the final analytical expression for the deflection $w(x,y)$, supporting your derivation with a neat labeled sketch of the plate and coordinate system.	1	5
Q2	At a point inside an elastic body, the displacement field in Cartesian coordinates is given by $u = 2x^2y, \quad v = 3xy^2, \quad w = 4xz$ where u,v,w are displacement components in the x,y,z directions respectively (in mm), and (a) Determine all six strain components at the point using strain–displacement relations. (b) Using generalized Hooke's law for an isotropic material with E=200 GPa and $\nu=0.3$, compute the corresponding stress components. (c) Verify whether the equilibrium equations are satisfied in the absence of body forces.	2	5
Q3.	Find the ratio of thickness to internal diameter of a tube subjected to internal pressure when the pressure is 5/8 of the maximum permissible circumferential stress. Find the increase in internal diameter of such a tube 100mm internal diameter when the internal pressure is 90 N/mm^2 . E=200 GPa and $\nu=0.286$	2	5

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