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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2026

M.Tech-II Semester (SE)

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

COURSE NAME: THEORY OF PLATES AND SHELLS

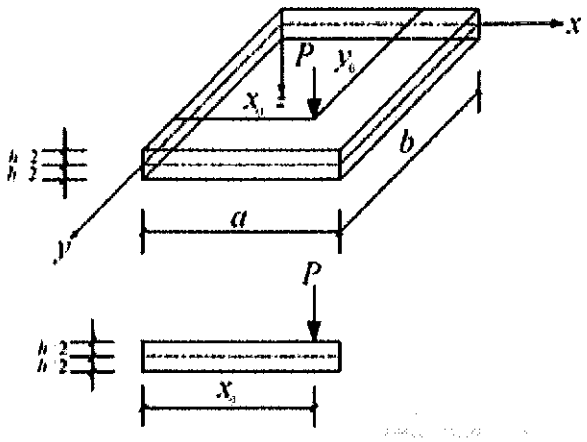
COURSE INSTRUCTORS: DR. SAURAV MAX. TIME: 1 Hour 30 Min

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	Derive the expression for the deflection surface of a simply supported rectangular plate of size a×b subjected to a sinusoidal load $q(x,y)=q_0\sin(\frac{\pi x}{a})\sin(\frac{\pi y}{b})$ Also derive the equation to compute the deflection of the plate w	3	7
Q2	A simply supported rectangular plate of size a=2 m, b=1.5 m is subjected to a sinusoidal load: $q(x,y)=5000\sin(\frac{\pi x}{a})\sin(\frac{\pi y}{b})$ Find a) Maximum deflection of the plate b) Deflection at point x=a/2, y=b/2	3	4
Q3.	A thin, isotropic rectangular plate of dimensions a×b is simply supported along all four edges, as shown in the figure. The plate is subjected to a concentrated load P acting at a point (x_0,y_0) on its surface. Using Navier's method, derive the expression for the maximum deflection of the plate due to the concentrated load P. Hence, obtain the simplified expression for maximum deflection when the load acts at the centre of the plate. Further, deduce the expression for maximum deflection for a square plate (a=b).	2	7

			
Q4.	A thin isotropic plate is under pure bending. Prove that the relation for curvature in an arbitrary direction n making an angle α with the x-axis is given by $$\frac{1}{r_n} = \left(\frac{1}{r_x} \cos^2 \alpha - \frac{1}{r_{xy}} \sin 2\alpha + \frac{1}{r_y} \sin^2 \alpha \right)$$ Hence, prove that the directions corresponding to the maximum and minimum curvatures/slopes are orthogonal to each other.	3	7