

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION- May -2017

B.Tech<sup>8<sup>th</sup></sup> Sem/ M.Tech 2<sup>nd</sup> Semester

COURSE CODE: 12M1WCE214

MAX. MARKS: 35

COURSE NAME: THEORY OF PLATES AND SHELLS

COURSE CREDITS: 03

MAX. TIME: 2 HRS

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*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

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- Q1.** Deduce the differential equation to find deflection, bending moments and shear force for a simply supported rectangular plate under sinusoidal loading. (5)
- Q2.** For a thin cylindrical vessel compute volumetric strain in terms of  $P$ ,  $D$ ,  $t$ , and  $\mu$  (5)
- Q3.** A thin cylindrical pressure vessel of diameter 2.5m and thickness 18mm is subjected to an internal pressure  $1.2\text{N/mm}^2$ . In addition the vessel is also subjected to an axial tensile load of 2800kN. Determine the normal and shear stresses on a plane at an angle of  $60^\circ$  to the axis of the vessel. Find also the maximum shear stress. (5)
- Q4.** Deduce the equation of a circular plate with a hole at the centre (5)
- Q5.** With the help of Mohr's circle find the equations of principal curvature and principal planes in case of pure bending of plates. (5)
- Q6.** Find the ratio of thickness to internal diameter for a tube subjected to internal pressure, when the pressure is  $5/8$  of its maximum permissible circumferential stress. Find the increase in internal diameter of such a tube 100mm internal diameter, when the internal pressure is  $90\text{N/mm}^2$ .  $E=2 \times 10^5 \text{N/mm}^2$  and  $\mu=0.286$  (5)
- Q7.** Deduce an equation to find the radial pressure and hoop stress at any distance  $x$  in case of thick cylinders. How these two are inter related? (5)