UPES
UNIVERSITY OF TOMORROW

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
END SEMESTER, MAY 2022

Course: Theory of Plates & Shells **Semester: II**
Program: M. Tech (Structural Engineering) **Time: 3Hrs**
Course Code: CIVL 7012 **Max. Marks: 100**
Instructions: Attempt all the questions

SECTION A			
S. No.		Marks	CO
Q.1	Briefly explain the deflection profile of rectangular loaded plates.	4	CO1
Q.2	Write max deflections & stress produced in cylindrically plates with clamped edges	4	CO2
Q.3	Briefly explain membrane theory of shells.	4	CO3
Q.4	Write equations of equilibrium of shells.	4	CO4
Q.5	How do you classify shells into long and short shells as per various theories?	4	CO4
SECTION B			
Q.6	Derive the expression for Bending moment & curvature in pure bending of plates	10	CO1
Q.7	Derive the differential equation for deflection for the symmetrical bending of a circular plate with lateral loads of the type $\frac{d^3w}{dr^3}+\frac{1}{r}\frac{d^2w}{dr^2}-\frac{1}{r^2}\frac{dw}{dr}=\frac{q}{d}$ where Q= shear force, q = Intensity of loading, r = radius of plate, D = flexural rigidity of plate	10	CO2
Q.8	A cylindrical shell subject to UDL (Self-weight + imposed load). Derive the expression for $N\emptyset, N_x$ & $N_{x\emptyset}$	10	CO3
Q.9	Calculate the membrane stress at central span, quarter span & end section for a cylindrical shell of 22m span,10m radius & semi vertex angle 40^0. Shell is 80mm thick & subjected to all-inclusive UDL of 3kN/m² **OR** Derive the expression for equations of equilibrium of a shell	10	CO4
SECTION-C			
Q.10	A spherical dome of 15m radius & rise 4m carries an all-inclusive load of 3kN/m². Calculate the various stresses developed in the shells due to this load.	20	CO3
Q.11	A bending of the rectangular plate by moment- distributed along the edges and all the edges simply supported. **OR** Derive expressions for deflection, shear force and bending moment for a circular plate with simply supported boundary conditions subjected to uniformly distributed loading.	20	CO2