## **GUJARAT TECHNOLOGICAL UNIVERSITY**

## M.E. SEMESTER III-EXAMINATION (Remedial)- WINTER 2015

Subject code: 731504 Date: 07/12/2015			)15	
Sub Tim Inst	Time: 2:30 PM to 5:00 PM Total Marks: '		<b>'</b> 0	
Inst	1. 2. 3. 4.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks. Draw neat and clean sketches with pencil only.		
Q.1	(a)	State the boundary conditions of following plates. (1)Cantilever, (2)Square simply supported at all edges (3) Square fixed Plates at all edges	07	
	<b>(b)</b>	Differentiate between "membrane theory" and "exact theory" of small deflection of plate. Explain stress resultants in both theories with sketches.	07	
Q.2	(a)	Derive the basic fourth order partial differential equation for a plate. Also write down the equation for shear and corner forces.	07	
	<b>(b</b> )	Give merits and demerits of Navier's solution and Levy's solution.	07	
	<b>(b)</b>	For cantilever rectangular plates, subjected to uniform pressure, deduce expression for deflection at the free end of plate.	07	
Q.3	(a)	Show that for a flat circular steel plate subjected to a uniform pressure on one surface, the maximum stress when periphery is simply supported is 1.65 times that when the periphery is clamped. Take Poisson's ratio, $v = 0.3$ .	07	
	(b)	Find N $\theta$ and N $\phi$ for conical dome due to self weight and live load uniformly distributed.	07	
0.3	(a)	Explain the shell behavior and the characteristics.	07	
	(b)	For simply supported rectangular plates, subjected to hydrostatic pressure, deduce expression for deflection at centre	07	
Q.4	(a) (b)	Give the classification of shell based on shell curvature with neat sketches. Develop basic equation of membrane analysis of a paraboloid of revolution.	07 07	
		OR		
Q.4	(a)	Derive equations of equilibrium for general bending theory of uniformly loaded cylindrical shell. Mark important internal stress resultants.	07	
	(b)	Explain force displacement relation for a shell structure.	07	
Q.5	(a) (b)	Explain the membrane analysis of shells of revolution. Write short note on shallow shells.	07 07	
Q.5	(a)	A simply supported at $(x = 0 \text{ and } x = L)$ semicircular cylindrical shell is subjected to a snow load 'q' which is uniformly distributed over its plan area. Given the radius of the shell is 'a', thickness is 'h', modulus of elasticity and Poisson's ratio are E and v respectively, determine the membrane stresses in the shell.	07	

(b) Explain the stability criteria of plate.

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