Code No: CE 1914 **R14**

M.Tech II Semester Regular Examinations, September 2015
THEORY OF PLATES AND SHELLS
(Structural Engineering)

Time : 3 Hours **Max. Marks : 60**

Note: Answer Any Five Questions. All Questions carry equal marks.

1. Using Levy's approach , obtain the expression for the deflected shape of a rectangular plate with long edges being fixed while short edges simply supported and subjected to a uniformly distributed load throughout the surface. (12M)

2. A circular plate of radius '**a**' fixed at its periphery is subjected to a uniform load of intensity $\mathbf{P_0}$**.** Obtain the expressions for the deflection, radial and transverse moments and their maximum values. (12M)

3. a) Derive the governing differential equation for a symmetrically loaded circular plate. (6M)
   b) A circular plate of radius' R' fixed along the circumference is subjected to a concentrated load 'W' at the centre of the plate. Find the maximum deflection in the plate and locate its position. (6M)

4. Draw a typical cylindrical shell element and indicate membrane forces, transverse shears and moments. Give the relations among the forces and moments on its positive and negative faces. (12M)

5. a) List out the advantages and disadvantages of shells. (6M)
   b) Explain about the principles of membrane theory and bending theory in the analysis of cylindrical shells. (6M)

6. a) Enumerate the basic assumptions made in the analysis of cylindrical shells according to i) D.K.J theory and ii) Schorer's theory. Comment on the above two theories with reference to analysis and applications. (6M)
   b) Given the equilibrium equations obtain the differential equation in terms of stress function for doubly curved shell for membrane stress theory. (6M)

7. State and derive the simplified relations between stress resultants and the displacements for a cylindrical shell according to D.K.J theory when it is subjected to dead load **g/unit** surface area. (12M)

8. Analyze and derive the simplified relations for an Elliptic paraboloid shell by membrane theory for snow load only. (12M)

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