

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
SECOND SEMESTER M.TECH. DEGREE EXAMINATION, APRIL 2017  
CIVIL ENGINEERING  
**COMPUTER AIDED STRUCTURAL ENGINEERING**  
**10CE6114: THEORY OF PLATES AND SHELLS**

Max Marks: 60

Duration: 3 Hours

**Part A (Modules I - II)**

*(Answer any two questions:  $9 \times 2 = 18$  Marks)*

1. What are the assumptions made in the classical small deflection theory of homogeneous thin plates. (9)
  
2. Prove that slightly bent plate under pure bending, the direction of maximum slope and zero slope are at right angles to each other. (9)
  
3. Explain the solution techniques for fourth order differential equation of laterally loaded thin plate. (9)

**Part B (Modules III - IV)**

*(Answer any two questions:  $9 \times 2 = 18$  Marks)*

4. Derive the expression for deflection of uniformly and symmetrically loaded circular plate (9)
  
5. Obtain the expression for deflection and bending moments of a simply supported annular plate with edge moments. (9)
  
6. a) What are folded plate structures? Describe the various types. (4)

b) Explain load transfer mechanism of folded plates with neat sketches (5)

**Part C (Modules V & VI)**

*(Answer any two questions: 12 x 2 = 24 Marks)*

7. a) Describe membrane theory of shells. (5)

b) Derive the expression for membrane forces in cylindrical shells. (7)

8. Derive the expression for thin shells of revolution and symmetrically loaded with respect to their axis. (12)

9. a) Explain beam theory for the analysis of cylindrical shell roof. (8)

b) Draw a typical cylindrical shell roof and denote its various parts. (4)