

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech., Winter 2017 - 18 Examination

Semester: 2
Subject Code: 03209155
Subject Name: Theory of Plates and Shells

Date: 11/01/2018
Time: 2:00 pm to 4:30 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1** A) Briefly explain the classification of plates. (05)
B) State the assumptions made in theory of shells. (05)
C) Explain briefly the following terms with neat sketches: (I) Shells of translation (II) folded plates (05)

Q.2 Answer the following questions. (Attempt any three) (15)

- A) Derive the Levy's solution for analysis of simply supported rectangular plate of size $a \times b$.
B) Differentiate between beam and plate.
C) Define shells and explain the difference between plates and shells in terms of structural superiority.
D) Derive the expression for strains in plate in terms of displacement 'w'.

- Q.3** A) Prove that in a slightly bent plate under pure bending, the directions of maximum slope and zero slope are at right angles to each other. (07)

- B) Derive the equations of equilibrium for doubly curved shell of revolution using membrane theory. (08)

OR

- B) Derive the differential equations for the displacements u , v , w which define deformation of shell. (08)

- Q.4** A) Derive the differential equations of equilibrium using membrane forces only. Find the stresses N_x , N_y and N_{xy} due to uniformly distributed load acting on the shell roof. (07)

OR

- A) Define Gauss curvature? Briefly explain classification of shells based on Gauss curvature values. (07)

- B) Derive equilibrium equations for rectangular plate with small deflections when subjected to lateral loads. (08)