Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech Regular Winter 2018 - 19 Examination

Semester: 1 **Date: 12/12/2018**
Subject Code: 203209130 **Time: 10:30 AM to 1:00 PM**
Subject Name: Theory of Thin Plates and Shells **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) Explain what you understand by theory thin plates. Also enlist the assumptions in theory of thin plates. **(05)**

B) Write various advantages and disadvantages of plates and shells considering their structural aspects. **(05)**

C) Write the assumptions made in theory of shells. **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

A) Derive the expression for moment curvature (stress couples) for pure bending of thin rectangular plate.

B) Briefly explain Rayleigh-Ritz approach for analysis of thin rectangular plates.

C) What is folded plates and show its structural behavior.

D) Briefly classify shells based on curvatures

Q.3 A) Derive the expressions showing strain displacement relationships in case of thin plates. **(07)**

B) A rectangular plate of sides a and b is simply supported on all edges and subjected to a uniform pressure $q(x,y)=q_0$. Derive the expression for deflection using Navier's solution. **(08)**

OR

B) Show that planes of principal curvatures are the plane of extreme curvatures also. **(08)**

Q.4 A) Briefly explain membrane theory of Cylindrical Shells and derive equilibrium equations for shells of revolutions. **(07)**

OR

A) Explain short notes on following:
- i. Gauss Curvature in shells.
- ii. Applications of shells.
- iii. Thermal Stresses in Shell.

(07)

B) Explain flexural rigidity of the plate and governing equation for deflection of plates in Cartesian coordinates. **(08)**