# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
## LONERE – RAIGAD -402 103
## Regular Summer Semester Examination – 2022

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**Branch: Computer Aided Structural Engineering** **Sem.:- II**

**Subject with Subject Code:- CASE201: Theory of Plates and Shells** **Marks: 60**

**Date:-17-10-2022** **Time:- 3 Hr.**

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**Instructions to the Students**

1. Each sub-question carries 06 marks.
2. Attempt **any two sub-**questions from each question.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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**SET-I** **(Marks)**

Q.1. a) What are the assumptions made in thin plates with small deflections? (06)

b) Derive the moment curvature relationship in the case of pure bending of plates (06)

c) A long narrow simply supported rectangular plate 1 m wide, 10 mm thick subjected to a uniform distributed load of 1.0 KN/m². Taking poisons ratio=0.3, and E=200GPa. Find maximum deflection and B.M. (06)

Q.2. a) Find Levy's solution for simply supported and uniformly loaded rectangular plates. (06)

b) A simply supported rectangular plate of dimension a x b x h is subjected to load 'P' acting over an area XY, Derive the expression for deflection, Adopt Navier's approach. (06)

c) Differentiate Navier's and Lavy's method for the analysis of thin plate

Q.3. a) Derive the differential equation for deflection for the symmetrical bending of a circular plate with lateral loads of the type.

$$\frac{d^3w}{dr^3}+\frac{1}{r}\frac{d^2w}{dr^2}-\frac{1}{r^2}\frac{dw}{dr}=\frac{Q}{D}$$ (06)

b) Give the difference between the circular plate with and without hole with respect to analysis (06)

c) Find the transverse deflection w, radial moment Mr, tangential moment $M_0$ and corresponding stresses for a simply supported circular plate subjected to UDL (q) (06)

Q.4. a) State and explain assumption in the theory of thin elastic shells. (06)

b) How do you classify shells into long and short shells as per various theories (06)

c) State the application of membrane theory to pipe and hence derive an expression for Nx, Nϕ and Nxϕ. (06)

Q.5. a) State the assumptions in Schorer's theory of cylindrical shells and drive the sharer's Differential equation (06)

b) Derive the equations of equilibrium of membrane theory for cylindrical shells (06)

c) Obtain expression for transverse deflection using Pinner Welder theory. (06)