K. K. Wagh Institute of Engineering Education and Research, Nashik

(An Autonomous Institute from A. Y. 2022-23)

Marking Scheme set 1

End-Sem Examination, Winter 2025

Academic Year: 2025-2026	Semester: I
Class: PG-I	Program: Structural Engineering
Branch Code:CIV	Pattern: 2024
Name of Course: Theory of Plates and Shells	Course Code: 2404511

Q.1a ***(6 Marks)***

Mark Distribution:

- **Definition of thin and thick plates – 2 marks**
- **Assumptions of thin plate theory (any four) – 4 marks**

Q.2a ***(6 Marks)***

Mark Distribution:

- **Concept of Levy's method – 2 marks**
- **Assumptions / presumptions (any four) – 4 marks**

Q.3a ***(8 Marks)***
Mark Distribution:

- **Governing differential equation – 2 marks**
- **General solution for deflection – 2 marks**
- **Application of boundary conditions – 2 marks**
- **Expression for radial bending moment (Mr) – 2 marks**

Q.3b ***(8 Marks)***
Mark Distribution:

- **Assumptions of axisymmetric bending – 2 marks**
- **Equilibrium of circular plate element – 2 marks**
- **Differential equation derivation – 2 marks**
- **Final governing equation – 2 marks**

Q.3c ***(8 Marks)***
Mark Distribution:

- **Governing equation and assumptions – 2 marks**
- **Solution for deflection w – 3 marks**
- **Boundary conditions – 1 mark**
- **Expression for Mr – 2 marks**

Q.3d ***(8 Marks)***
Mark Distribution:
- **Symmetry conditions and assumptions – 2 marks**
- **Differential equation – 2 marks**
- **Solution steps – 2 marks**
- **Final bending equation – 2 marks**

Q.4a ***(8 Marks)***
Mark Distribution:
- **Advantages of shells (any four) – 4 marks**
- **Disadvantages of shells (any two) – 2 marks**
- **Assumptions with implications – 2 marks**

Q.4b ***(8 Marks)***
Mark Distribution:
- **Classification (any four) – 6 marks**
- **Examples – 2 marks**

Q.4c ***(8 Marks)***
Mark Distribution:
- **Neat labeled sketch – 2 marks**
- **Stress resultants identification – 2 marks**
- **Equilibrium equations derivation – 4 marks**

Q.4d ***(8 Marks)***
Mark Distribution:
- **Explanation of membrane theory – 3 marks**
- **Assumptions – 3 marks**
- **Limitations / applications – 2 marks**

Q.5a ***(8 Marks)***
Mark Distribution:
- **Basic concept – 2 marks**
- **Assumptions – 3 marks**
- **Stress resultants and applications – 3 marks**

Q.5b ***(8 Marks)***
Mark Distribution:
- **Introduction to D-K-J theory – 2 marks**
- **Governing equilibrium equations – 4 marks**
- **Significance / application – 2 marks**

Q.5c ***(8 Marks)***
Mark Distribution:

- **Membrane theory explanation – 3 marks**
- **Bending theory explanation – 3 marks**
- **Comparison table / distinction – 2 marks**

Q.5d ***(8 Marks)***
Mark Distribution:

- **Beam theory concept – 3 marks**
- **Advantages – 3 marks**
- **Limitations – 2 marks**