



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

	SUMMER-2023		
	Exam Seat No.:		
	Academic Year: 2022-2023	Semester: II	
	Name of Programme: M.Tech	Pattern: 2022	
	Name of Course: Theory of Plates and Shells	Course Code: CIV225107	
	Max. Marks: 60	Duration: 2.30	

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question

Question No. 1 Attempt following Question

- 1a) State the assumptions in the small deflection theory of thin plate. (6) CO1

Question No. 2 Attempt following Question

- 2a) Distinguish between thin and thick plate bending. (6) CO2

Question No. 3 Attempt following Question

- 3a) Derive the Governing equation of the Circular Plate (8) CO3

OR

- 3b) Derive the equation of deflection for circular plate subjected to centre concentrated load (8) CO3

- 3c) Derive the equation of deflection for circular plate subjected to UDL with fixed support. (8) CO3

OR

- 3d) Derive the equation of deflection for simply supported circular plate subjected to UDL. (8) CO3

Question No. 4 Attempt following Question

- 4a) State the advantages and disadvantages of shell structures compared to plates. (6) CO4

OR

- 4b) Draw and explain the diagram of surface revolution of shell (6) CO4
4c) Derive the equilibrium equation of surface revolution of shell along the tangent to parallel of latitude (θ direction) (10) CO4

OR

- 4d) Derive the equilibrium equation of surface revolution of shell along the direction of tangent to the meridian curve. (10) CO4

Question No. 5 Attempt following Question

- 5a) Write down the Short Note on
i. Principle curvature
ii. Membrane Action
iii. Membrane state of stress (6) CO5

OR

- 5b) Classify thin shell into various types based on shell geometry and curvature. (6) CO5
5c) Derive the equilibrium equations for general theory of cylindrical shell, considering actions on an infinitesimal element. (10) CO5

OR

- 5d) Derive expressions for the strains at a point due to the bending and membrane (stretching) action in a shell. Hence obtain expressions for the stress resultants in terms of strain. (10) CO5