Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER M.TECH DEGREE EXAMINATION (Regular), DECEMBER 2022

STRUCTURAL ENGINEERING AND CONSTRUCTION MANAGEMENT

(2021 Scheme)

Course Code: 21SC105-D

Course Name: Theory of Plates and Shells

Max. Marks: 60 **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Demonstrate on how a 3D plate problem can be reduced to 2D.
2. Relate the moment and curvature for a thin plate in pure bending.
3. Illustrate the boundary conditions of a rectangular plate with simply supported edge and built in edge with figure.
4. Find the maximum moments for a simply supported square plate subjected to sinusoidal load. Take μ= 0.3
5. Develop the boundary condition of circular plates having circumferential edge completely fixed with figure.
6. Derive the expression for radial moment for circular plates when r is coinciding with x axis.
7. Differentiate shells of revolution and shells of translation with an example for each.
8. Summarize the structural behavior of folded plates.

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

9. Classify plates based on their thickness. (6)

OR

10. Develop the differential equation for cylindrical bending of plates. (6)

MODULE II

11. For a case of pure bending of plates, derive the expressions for bending and twisting moments in arbitrary directions. (6)

OR

12. For pure bending of plates show that the directions of maximum and minimum slope are perpendicular to each other. Also find the maximum and minimum slopes. (6)

MODULE III

13. Derive the solution for simply supported rectangular plates subjected to sinusoidal load and obtain the maximum deflection. (6)

OR

14. Derive the fourth order differential equation of laterally loaded rectangular plates. (6)

MODULE IV

15. Develop the expression for deflected surface for a simply supported rectangular plate subjected to a uniformly distributed load 'q' over its entire area using Levy's solution. (6)

OR

16. The deflection of simply supported rectangular plates subjected to uniformly distributed load is zero. Justify the situation using Navier solution. (6)

MODULE V

17. Formulate the differential equation for symmetrical bending of laterally loaded circular plates. (6)

OR

18. Show that for a uniformly loaded circular plate with completely fixed edges, the radial and circumferential stresses are the same at the centre. (6)

MODULE VI

19. Summarize the classification of shells with neat figures. (6)

OR

20. Explain any three methods of analysis of folded plates. (6)

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