SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
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QUESTION BANK

Subject with Code: THEORY AND DESIGN OF PLATES AND SHELLS (TD&PS) (16CE2013)

Course & Branch: M. Tech - Structural Engineering

Year & Sem: I M.TECH & II-Sem **Regulation:** R16

UNIT-I

LATERALLY LOADED THIN PLATES

1. a) Derive the relations between bending moments and curvature in pure bending of plates?

   b) Give a brief account of classifications of plates.

2. a) What are the assumptions in pure bending.

   b) Derive the differential equations for plate subjected to cylindrical bending.

3. a) Derive the governing differential equation of a plate subjected to lateral loads from fundamentals.

b) Distinguish between thin plate with small deflection and thin plate with large deflection.

4. a) What are the assumptions made in pure bending of thin plates.

   b) Derive the differential equation for plate subjected to cylindrical bending.

5. a) Derive the moment curvature in the case of pure bending of plates.

   b) Give a brief account of classification of plates.

6. Derive the Navier solution for simply supported rectangular plates and obtain the maximum deflections.

7. Derive the differential equations of cylindrical bending of uniformly loaded rectangular plates will simply supported edges.

8. Derive the differential equations of small deflections of laterally loaded plates (Lagrange's equations).

9. a) Briefly explain about classification of plates.

   b) What are the assumptions of pure bending?

10. Derive the differential equations of cylindrical bending of uniformly loaded rectangular plates with built in edges.

UNIT-II

SUMMETRICAL BENDING OF CIRCULAR PLATES

1. A rectangular plate a x b simply supported at the edges is subjected to sinusoidal loading. Using the Navier solution, obtain the general expressions for deflection and bending moment.
2. Find the deflection equation for a plate subjected to hydro static pressure use Levy's basic equation for calculating deflection.
3. Determine the deflection and internal moments of simply supported rectangular support plate of size a x b.
4. A uniform loaded solid circular plate with radius ''a'' has its edges simply supported obtain the expressions for the maximum deflection and obtain BM'S.
5. A long narrow simply supported rectangular plate 1m wide ,10mm thick subjected to a uniform load of 1.0N/M2.Taking poisons ratio=0.3, and E=200Gpa. Find maximum deflection and B.M.
6. Derive the general solution for simply supported rectangular plates. Obtain the maximum deflection .What happens if the plate is square of side a.
7. Determine the deflection and internal moments of simply supported rectangular support plate of size a x b.
8. A uniform loaded solid circular plate with radius 'a ' has its edges simply suppored obtain the expressions for the maximum deflections and obtain bending moments.
9. Find the deflection equation equation for a plate subjected to hydrostatic pressure use Levy's basic equation for calculating deflection.
10. Determine the deflection and internal moments of simply supported rectangular support plate of size a x b.

UNIT-III

1. (a) Differentiate between long shells and short shells.

   (b) Explain the bending and membrane theories for analysis of shells.
2. Briefly explain about the classification of shells?
3. (a)Explain about the various types of shells with neat sketches?

   (b)Explain about the advantages and disadvantages of the shells.
4. Explain about beam analysis.
5. Explain the bending and membrane theories for analysis of shells
6. Derive the membrane equation for shells.
7. Explain about the bending theory of shells.
8. (a) Differentiate between long shells and short shells.

   (b) Explain about the advantages and disadvantages of the shells.

9. Briefly explain about the types of shells?
10. Explain the following

    a) Membrane behavior

    b) Membrane equation

UNIT-IV

1. Derive geometrical relations for shells of double curvature.
2. Derive the governing differential equation for the membrane analysis of shells of double curvature.
3. Derive the membrane stress resultants for rectangular hyperbolic paraboloid on straight line generators.
4. Derive the equilibrium equation of rectangular shell.
5. Derive the membrane differential equation for the elliptic paraboloid.
6. Derive the membrane differential equation for the rotational paraboloid.
7. Explain about membrane theory of anticlastic shells.
8. Derive the general equations for axisymmetric shells of revolution.
9. Explain about membrane theory of anti-elastic shells (hyperbolic paraboloid).
10. Write a short note on

    a) Anti-symmetric shells

    b) Singly curved shells

    c) ISI classification of shells

UNIT-V

FLODED PLATE STRUCTURES

1. Explain step by step procedure of analysis of folded plates by Whitney's method.
2. Explain the merits and de merits of folded plates. State the basic assumptions.
3. Explain the types of folded plates with neat sketches
4. What are the basic assumptions considered in analysis of folded plates?
5. Explain the effects of joint moments in folded plates.
6. Explain the moment distribution method for analysis of folded plates.

7. Explain the force method for analysis of folded plates.
8. Explain step by step procedure of analysis of folded plates by Simpson's method.
9. What are the assumptions and limitations for Simpson's method of folded plates?
10. (a) Explain plate action and slab action in folded plate theory.
    (b) Derive the three edge shear equation

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