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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Aerospace Engg.) (EL-2012 Batch) (Sem.-7,8)

THEORY OF PLATES SHELLS

Subject Code : ASPE-409

M.Code : 72572

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Write briefly :**

- (i) What is a reinforced Mate?
- (ii) Write expression for flexural reigidity of a plate.
- (iii) Write expression of M_x is terms of deflection ' ω ' on the plate in Z- direction.
- (iv) What is anticlastic surface?
- (v) What is synclastic surface?
- (vi) Write end conditions for a plate whose all edges are fixed.
- (vii) Define critical load of a plate.
- (viii) Define buckling load of a shell.
- (ix) What do you mean by flexural rigidity of a shell?
- (x) What do you mean by principal moments?

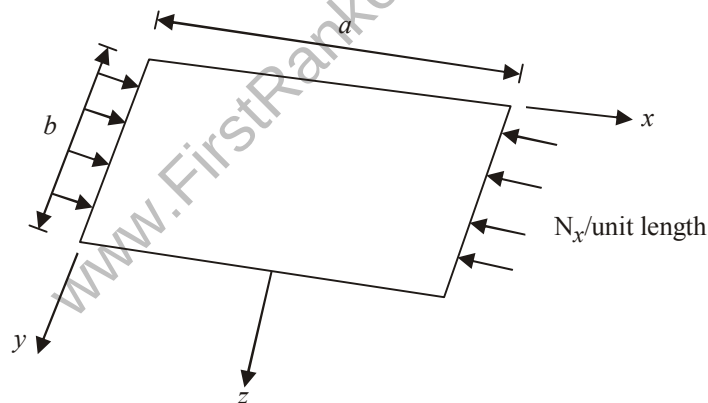
SECTION-B

2. A plate of length ' l ' and breadth ' b ' is subjected to bending moments M_x and M_y per unit length distributed along its edges. Obtain the expressions of M_x and M_y in terms of deflection ' w ' on the plate in the Z-direction.

3. A rectangular plate is subjected to bending and twisting moments. Obtain the expressions for normal and tangential components of the moments and hence define principal moments and principal curvatures.
4. A rectangular plate is subjected to distributed lateral load of intensity 'q' per unit area. Obtain the expressions to prove that $(\nabla^2)^2 w = \frac{q}{D}$ where D is flexural rigidity.
5. A circular cylindrical shell is subjected to bending loads. Obtain the relations for strain energy of deformation of the shell.
6. A cylindrical shell is subjected to uniform axial compressive load. Derive the differential equation and obtain the value of critical stress.

SECTION-C

7. A thin rectangular plate of dimensions $a \times b$, simply supported along each of its four edges carries a distributed load $q(x, y)$. Obtain the expression for deflection 'w' of the plate in terms of fourier series.
8. A thin rectangular plate of dimensions $a \times b$ is simply supported along all four edges and is loaded as shown below. Obtain the expression for critical stress of the plate.



9. Write notes on :
 - a) Differential equations for bending of strip.
 - b) Deformation of thin shell in presence of shear stresses.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.