Time allowed: 2 hour
Maximum Marks: 50

Q. 1.   Consider a rectangular plate of dimension $a \times b$ with two opposite edges simply supported. the other two edges clamped. The plate is subjected to uniformly distributed load q_0. Determine the maximum bending moment using Levy's solution procedure

(10)

Q. 2.   Consider Love's equation for thin shells. Mention the admissible boundary conditions at (a) simply supported edge. (b) free edge of the shell.

(6)

Q. 3.   Express the in-plane forces in terms of in-plane strains for the case of thin shell.

(2)

Q. 4.   Consider a hemi spherical dome of radius a Assuming the shell to be membrane shell. determine the membrane stresses and radial displacement of the shell under its self-weight.

(10)

Q. 5.   The roof of an aircraft hanger (Fig. 1) is constructed with a circular cylindrical shell panel of radius a. Straight edges of the shell are simply supported. while the curved edges are free. Assuming it to be membrane shell, determine the membrane stresses (σ_{xx}, $\sigma_{\theta\theta}$, $\sigma_{x\theta}$). when the shell supports its won weight W.

(12)

Q. 6.   Consider a thin circular cylindrical shell of radius a. and length L is clamped on both the edges. If an internal pressure q_0 acts on the inner surface of the cylinder, find an expression for the radial displacement of the shell.
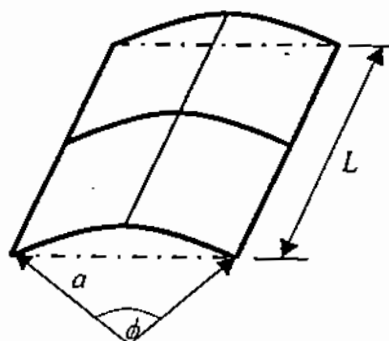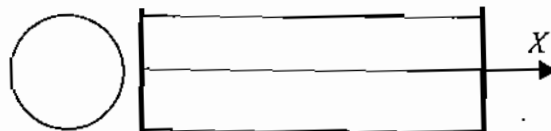
(10)

Fig 1. Geometry of a cylindrical panel

Fig. 2 Clamped circular cylinder