



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

DEPARTMENT OF AEROSPACE ENGINEERING

Subject Name: 19ASB201 Aero Mechanics of Solids



Unit Test

Part A

(3*3= 9 Marks)

1. Define polar moment of inertia and establish the equations for a solid and hollow circular shaft. Also write the governing equation for torsion of circular shaft?
2. Write the pure Torsion equation and solve a solid shaft of 150 mm diameter is used to transmit torque. Find the maximum torque transmitted by the shaft if the maximum shear stress induced to the shaft is 45 N/mm^2 .
3. What is spring index (C)? State any two major functions of a spring.

Part B

(3*7=21 Marks)

4. A solid shaft is to transmit 300kW at 100rpm if the shear stress is not exceeded 80 N/mm^2 . Find the diameter of the shaft. If this shaft were to be replaced by hollow shaft of same material and length with an internal diameter of 0.6 times the external diameter, what percentage saving in weight is possible.
5. A closely coiled helical spring of round wire 100mm in diameter having 10 complete turns with a mean diameter of 120mm is subjected to an axial load of 200N. Determine i) The deflection of the spring ii) Maximum shear stress in the wire iii) Stiffness of the spring. Take $C = 8 \times 10^4 \text{ N/mm}^2$
6. A hollow shaft is to transmit 200 kW at 80 rpm. If the shear stress is not to exceed 70 MN/m^2 and internal diameter is 0.5 of the external diameter. Find the external and internal diameters assuming that maximum torque is 1.6 times the mean.