

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
AERO SPACE STRUCTURES –I
 (AERONAUTICAL ENGINEERING)

MAY 2005

TIME – 3 HOUR
 MARK – 80

Answer any FIVE Questions
All Questions carry equal marks

1. Consider a solid circular shaft subject to a twisting moment of 2 KNm together with a bending moment of 3KNm. The diameter of the shaft is 100mm. Determine principal stresses and maximum shearing stress in the shaft. [16]
2. Determine the diameter 'd' of a circular shaft subjected to a bending moment M and torque T, according to
 - (a) Maximum Normal stress theory,
 - (b) Maximum Shear stress theory. [8+8]
3. (a) Write a note on the 'Use of Factor of safety'.
 (b) Discuss in brief 'Designing for fatigue loading'. [8+8]
4. (a) Differentiate between Primary shear and Secondary shear in rivets.
 (b) What are the assumptions for the design of eccentrically loaded rivetted joints. [8+8]
5. Explain Moment-Area method of determining slope and deflection of beams under loading with an example, for statically determinate case. [16]
6. State and prove Clapeyrons theorem of three moments. Write these from the simplified form of the equation for a beam simply supported at the ends and having only one support between the ends. [16]
7. A Cantilever beam of stepwise constant cross-section as shown below is loaded by a concentrated load at its tip. Determine the deflection under the point of application of load P by Castigliano's theorem. [16]
8. Two identical bars are pin-jointed and support a load \bar{A} as shown below. Determine the vertical displacement of point 'B' by energy method. [16]