Code: 9A21504 **R09**

B.Tech III Year I Semester (R09) Supplementary Examinations December 2015

AEROSPACE VEHICLE STRUCTURES – II

(Aeronautical Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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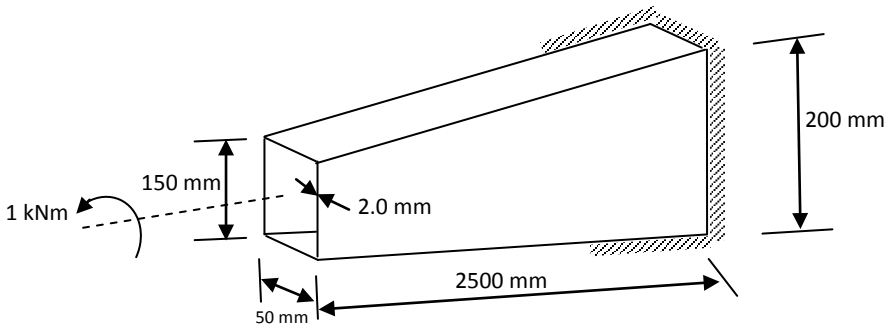
1 Explain the following terms:
(a) Ductility.
(b) Brittleness.
(c) Orthotropic materials.
(d) Plasticity.

2 Write short notes on the following:
(a) Aerodynamic loads.
(b) Ground load.
(c) Elastic buckling.

3 (a) Explain beam, frame and truss with neat sketches.
(b) What are longerons, transverse stringers and span web?

4 Derive the expression total torque of un-lipped 'I' section beam subjected to torsion with the help of neat sketches.

5 The following figure shows a thin-walled cantilever box beam having a constant width of 50 mm and a depth which decreases linearly from 200 mm at the built-in end to 150 mm at the free end. If the beam is subjected to a torque of 1 kNm at its free end, plot the angle of twist of the beam at 500 mm intervals along its length and determine the maximum shear stress in the beam section. Take G = 25000 N/mm^2.



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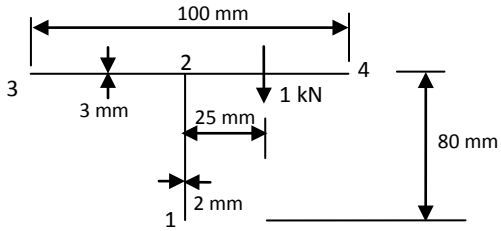
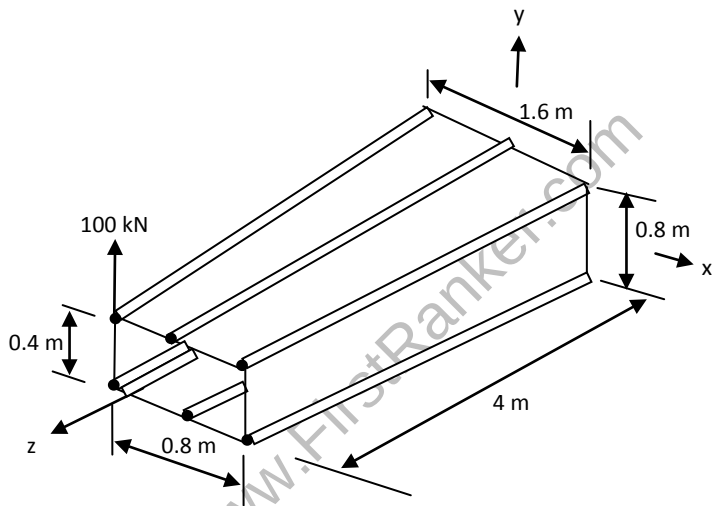
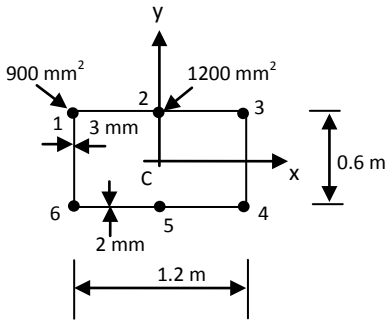
6 Determine the maximum shear stress in the beam section shown in figure below, stating clearly the point at which it occurs. Determine also the rate of twist of the beam section if the shear modulus G is 25,000 N/mm^2.

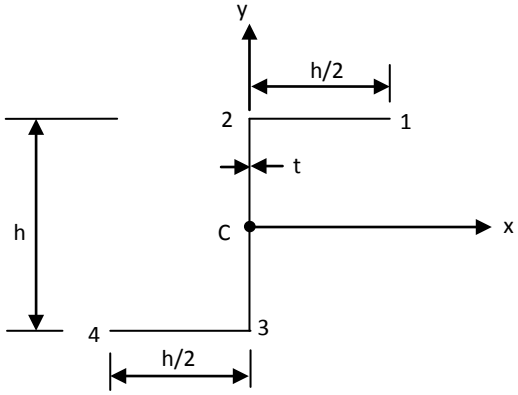


7 The cantilever beam shown in figure below, is uniformly tapered along its length in both x and y directions and carries a load of 100 kN at its free end. Calculate the forces in the booms and the shear flow distribution in the walls at a section 2 m from the built-in end if the booms resist all the direct stresses while the walls are effective only in shear. Each corner boom has a cross-sectional area of 900 mm^2, while both central booms have cross-sectional areas of 1200 mm^2.





8 Determine the direct stress distribution in the thin-walled z-section figure below, produced by a positive bending moment Mx.



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