Code: 9A21504 R09

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013

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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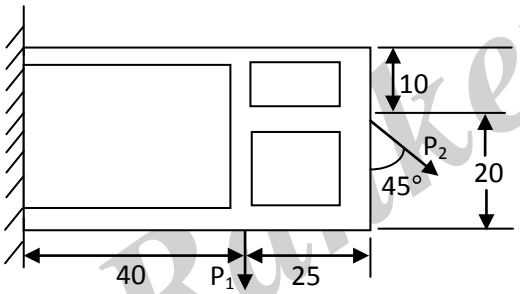
1 (a) Explain Wagner's theory and derive the equation with the help of neat sketches.

(b) Derive the relationship for shear force at any section of a tapered diagonal tension field beam, subjected to a load at its free end perpendicular to the axis in the plane of the beam.

2 (a) Explain critical bucking stress for a stiffened panel and how it differs from that of a flat plate.

(b) Find the shear flow in each web of the beam shown in the figure below. Plot the distribution of axial load along each stiffening member when P_1 = 20 kN and P_2 = 10 kN. All dimensions are in cm.

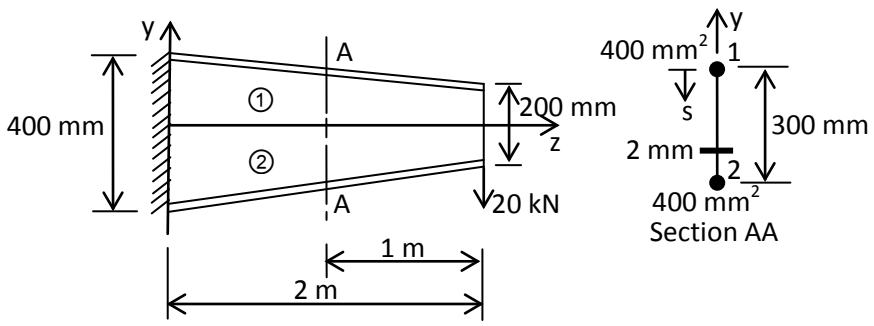


3 How to calculate effective width of the sheet if stringers like angles, hat sections etc, are attached to that sheet for ultimate compressive strength of flat sheet? Derive the equations.

4 (a) What is symmetric and unsymmetrical bending? Explain with the help of figures.

(b) Derive the shear stress formula for a symmetric beam subjected to transverse shear force 'F'.

5 Determine the shear flow distribution in the web of the tapered beam shown in figure at a section midway along its length. The web of the beam has a thickness of 2 mm and is fully effective in resisting direct stress. The beam tapers symmetrically about its horizontal centroidal axis and the cross-sectional area of each flange is 400 mm^2.



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Code: 9A21504

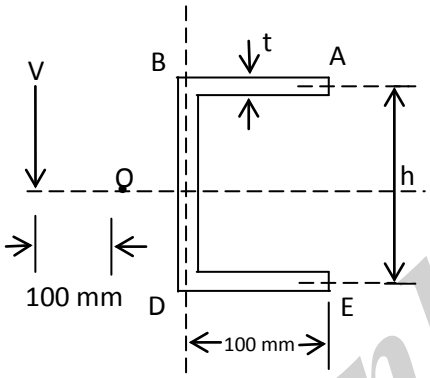
R09

6 Derive the expression for the total torque of 'I' section beam subjected to torsion with the help of neat sketches.

7 (a) Discuss the effect of torsion in open section beams and derive the equations for shear stress distribution and the maximum shear stress due to applied torque.

(b) Explain primary and secondary warping with the help of equations in terms of applied torque.

8 Un-lipped channel shown in figure, subjected to 11 kN load applied 100 mm away the shear centre O, which is producing torque. Find out shearing stresses distribution and torque intensity. S = b = 100 mm, V = 11 kN, t = 4 mm, h = 150 mm, e = 40 mm.



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