Code No: 07A62102 **R07** **Set No. 3**

III B.Tech II Semester Regular/Supplementary Examinations,May 2010
Aerospace Vehicle Structures -II
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. A cross section of a slit rectangular tube of constant thickness is shown in figure 1. Show that shear centre e= b(2h+3b)/2(h+3b). [16]

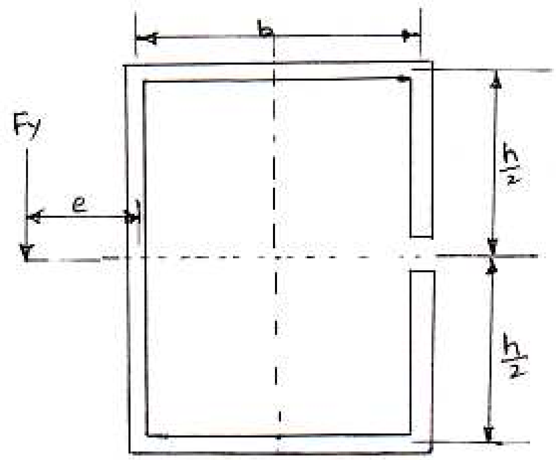

Figure 1

2. Unlipped channel shown in figure 8, subjected to 11KN load applied 100mm away the shear centre, 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. [16]

3. (a) Explain critical crippling load for extruded sections and bent sheet sections.
   (b) Find crippling stress for the angle section shown in figure 3b, using Gerard's method. Assume necessary data. [6+10]

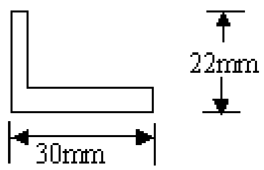

Figure 3b

4. Explain pure bending of thin plates and show that the deformed shape of the plate Is spherical and of curvature $1/\rho$ = M/[D(1+υ)] Where υ = poisons ratio, D is flexural rigidity, M is moment. [16]

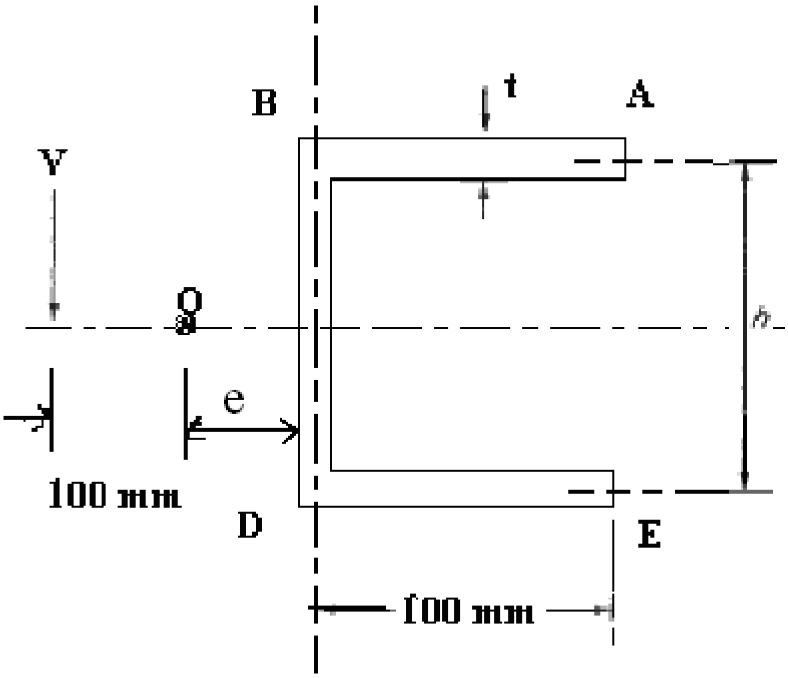

Figure 8:

5. Determine the maximum shear stress in the beam section shown in Figure 9 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. [16]

6. (a) 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.
   (b) Explain different types of structural members used in aircraft structures.
   (c) Explain different types of fuselage structures. [6+4+6]

7. What are the longorons, transverse stringers and span web? Explain their significance with the help of net sketches for wing and fuselage? [16]

8. An axially symmetric beam has the thin-walled cross-section shown in Figure 10 If the thickness t is constant throughout and making the usual assumptions for a thin-walled cross-section, show that the torsion bending constant _R calculated about the shear centre S is $\lceil R = \frac{13}{12} d^5 t$. [16]

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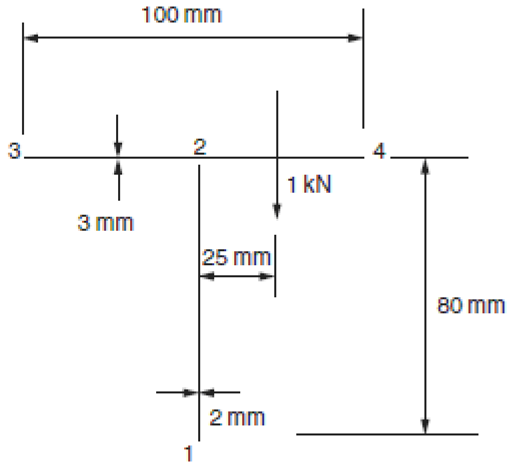

Figure 9:

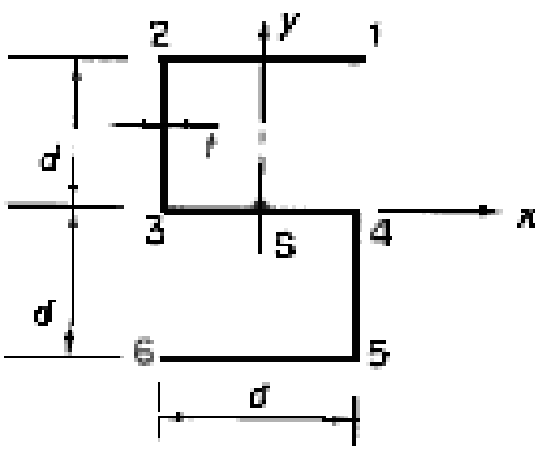

Figure 10: