Code No: NR322102 **NR**

III B.Tech II Semester Supplementary Examinations, Apr/May 2006
AEROSPACE STRUCTURES-II
(Aeronautical Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Find the ratio of angles twist of a seamless and of a split circular thin tube of equal geometrical dimensions under the action of equal torques. As shown in Figure 1 [16]

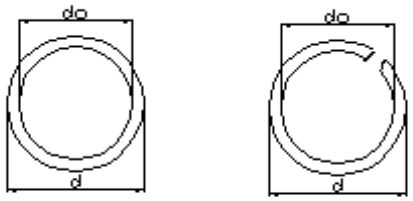

Figure 1:

2. The skin of the upper side of an airplane wing is of 24S-T Al clad material. The stringer spacing is 125mm and the rib spacing is 500mm. Assuming the edges to be simply supported, find compressive buckling stress for skin gages of [16]
   (a) 0.5mm
   (b) 0.8mm
   (c) 1.0mm
   (d) 1.6mm.
3. Write short notes on:
   (a) Inter-rivet buckling stress
   (b) Sheet effective width. [8+8]
4. Write short notes on:
   (a) Stress resistant web beams
   (b) Wagner beams. [8+8]
5. A timber joist, 100 mm wide and 200 mm deep, is freely supported over a span of 4 mts. It is subjected to a BM of 3×10^6 N - mm at the central section, the trace of the plane of loading being inclined at 30^o to the principal axis V-V. Locate the

neutral axis and calculate the maximum bending stress induced. If the BM is due to a load of 6000 N uniformly distributed over the whole span, calculate the central deflection. E = 104 N/mm^2. [16]

6. Derive the internal shear flow system and twist for the following section subjected to 20,000 N-Cm. Assume shear modulus, G = 20 GPa. Assume thickness = 1 mm. As shown in Figure 2. [16]

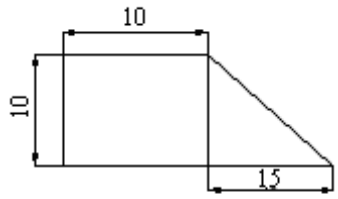

Figure 2:

7. A beam has the singly symmetrical, thin walled cross-section shown in figure 3. The thickness 't' of the walls is constant throughout. Show that the distance of the shear center from web is given by $\varepsilon = \frac{-d\ s^2\ Sin\alpha\ \cos\alpha}{1+6s+2s^2\ Sin^2\alpha}$
Where s=d/h [16]

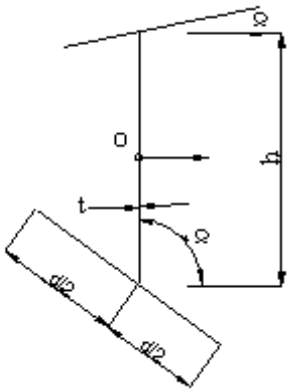

Figure 3:

8. Figure 4 shows the cross - section of a single cell, thin walled beam with horizontal axis of symmetry. The direct stresses are carried by booms B1 to B4, walls are effective only in carrying shear stresses. Assuming that the basic theory of bending is applicable, calculate the position of the shear center 'S'. The shear modulus 'G' is the same for the walls. Cell area = 135000 mm^2, Boom area: B1 = B4 = 450mm^2; B2 = B3 = 550 mm^2. [16]

WALL	LENGTH(mm)	THICKNESS(mm)
12,34	500	0.8
23	580	1.0
41	200	1.2

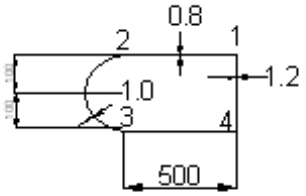

Figure 4:

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