Code No: RR322102 **Set No.1**

III B.Tech. II Semester Regular Examinations, April/May -2005
AIRCRAFT STRUCTURES-II
(Aeronautical Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain the unsymmetrical Bending with the help of a neat sketch.
   (b) Show the various possible cases of unsymmetrical bending with the help of sketches.
2. Explain the concept of Shear Stresses in thick beams with the help of neat sketch and draw the shear stress Variation.
   (a) Rectangular section
   (b) Circular section
3. (a) Explain what do you mean by shear centre.
   (b) Prove that the shear centre lies at the junction for an angle section with equal legs.
4. Explain the torsion of thin walled closed tubes subjected to twisting with the help of a neat sketch.
5. Explain the procedure of finding shear flow in to symmetric closed section, and location of shear centre for both single and multicell sections.
6. 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
   (a) 0.5mm
   (b) 0.8mm
   (c) 1.0mm
   (d) 1.6mm
7. What are the various forms of fuselage structures? Explain fuselage construction with the help of neat sketches?
8. Write short notes on the following:
   (a) stringers
   (b) bulk heads
   (c) floor beams
   (d) spar webs

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR322102 **Set No.2**

III B.Tech. II Semester Regular Examinations, April/May -2005
AIRCRAFT STRUCTURES-II
(Aeronautical Engineering)

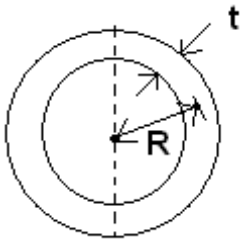
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. Derive the Equation for Bending stress in unsymmetric section about both the axes when it is subjected to moment M_z, M_y. Also locate the orientation of NA.
2. Derive the Shear stress formula for a symmetric beam subjected to transverse shear force 'F'.
3. Determine the shear centre for the circular section of radius R, thickness t having a navour shit.
4. Derive the Bredt- Batho formula related to torsion. What are the assumptions made?
5. Thin walled circular beam cross-section is subjected to transverse load. F.

   Determine the variation of shear flow through out the cross-section.



6. Calculate the compressive buckling stress for a sheet with a =200mm, b=100mm and t=4mm if all four edges are simply supported, all edges are clamped, if ends are simply supported and sides are free.
7. Describe the loads on aircraft structural components?
8. Write short notes on the following:
   (a) Types of riveted joints
   (b) Rivet failures

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR322102 **Set No.3**

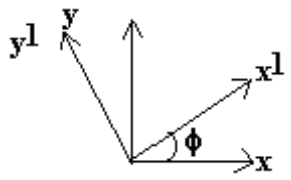
III B.Tech. II Semester Regular Examinations, April/May -2005
AIRCRAFT STRUCTURES-II
(Aeronautical Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. Derive the Equation for M.I. about the rotational axes when rotated by an angle θ about x- axis.

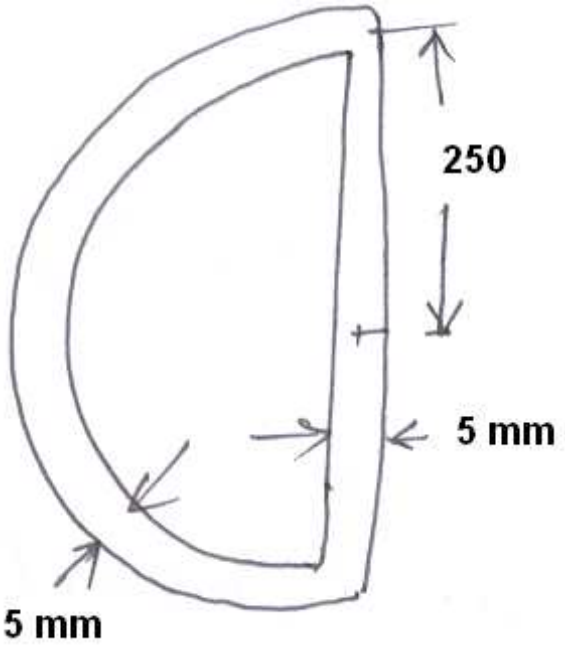


2. Derive the shear stress equation for Rectangular beam of breadth b, depth d. Also plot the variation of shear stress. Derive the relation for $\tau_{\max}/\tau_{\text{av}}$.

3. Explain what do you mean by effective wall and ineffective wall related to beams. Define boom show some composite beams with boom, flanges and webs.

4. Explain the torsion of thin walled multicell structure sectia subjected to twisting.

5. Determine the Shear centre location of an aircraft semi circular box beam.



6. A uniform flat plate of thickness 't' has a width 'b' in the y-direction and length 'l' in the x-direction. The edges parallel to the y-axis are simply supported. A

uniform compressive stress s is applied in the x-direction along the edges parallel to the y-axis. Find an appropriate expression for the magnitude of the stress s which causes the plate to buckle, assuming that the deflected shape of the plate is given by w=a11sin(mπ x/l)sin^2(π y/b). For the particular case l=2b, find the number of half waves m corresponding to the lowest critical stress, expressing the result to the nearest integer. Determine also the lowest critical stress.

7. What are the various functions of structural components?

8. Write short notes on the following:

   (a) Moment of inertia

   (b) Product of inertia

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR322102 **Set No.4**

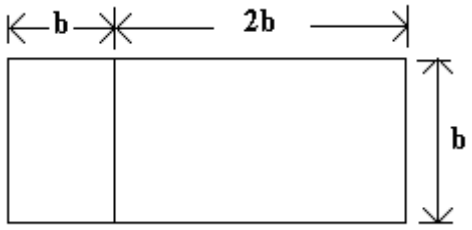
III B.Tech. II Semester Regular Examinations, April/May -2005
AIRCRAFT STRUCTURES-II
(Aeronautical Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. Derive the Equation for principle on M.I. For unsymmetrical section about both axes. If I_x I_y are M.I. about the centroidal axes and I_{xy} is the product of inertia.
2. Define shear flow? Explain the concept of shear flow in thin walled beams with the help of a neat sketch.
3. Determine the moment of inertia, shear flow and shear centre for a semi circular ring of radius R, uniform thickness t subjected to transverse shear force normal to symmetrical centroidal axis.
4. Derive the equation for Torque and angle of twist for two cell closed section.



5. Thickness is uniform locate the Shear Centre for the two compartment box beam t = 10mm, b = 500mm.
6. Write short notes on
   (a) Nedham's method
   (b) Gerard's method
7. What is structural idealization? Sketch the structural idealization for wing and fuselage?
8. Write short notes on the following:
   (a) Booms in structures
   (b) structural idealization

⋆ ⋆ ⋆ ⋆ ⋆