Reg. No. : | | | | | | | | | | | | |

Question Paper Code: 1015085

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV/ DEC 2024
Fifth Semester
Aeronautical Engineering
U20AE502 – AIRCRAFT STRUCTURES
(Regulation 2020)

Time: Three Hours Maximum: 100 Marks

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. State Neutral axis method.

2. Draw the bending stress distribution for a simply supported beam having rectangular cross section showing the neutral axis.

3. Define the term shear flow.

4. Sketch the shear flow distribution for a symmetrical channel section subjected to vertical load through the shear centre.

5. Write down the Bredt-Batho formula and state its signification.

6. Can you express the shear flow formula for a thin walled closed section subjected to Sx and Sy through the shear centre?

7. How the sheet stiffness panels are used in the aircraft structure component?

8. Distinguish between bending stress and buckling stress.

9. Define the load factors.

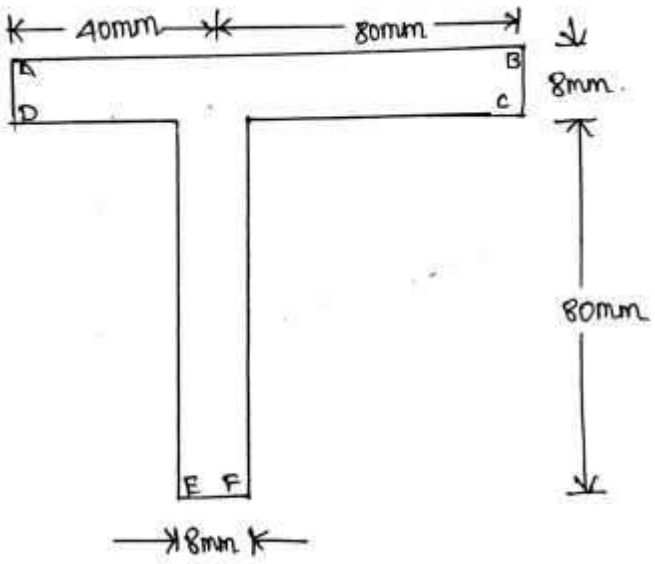
10. How the guest load is occurring?

PART – B (5 x 16 = 80 Marks)

11. (a) Analyze the bending stress of unsymmetrical section using K method. (16)

(OR)

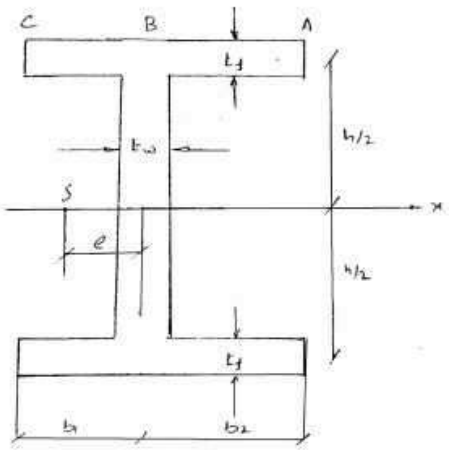
(b) A beam having the cross section shown in figure subjected to a bending moment of 1500Nm in vertical plane. Calculate the maximum bending stress due to bending. (16)



12. (a) A cross section in shape of an unbalanced I beam is shown in figure. (12)

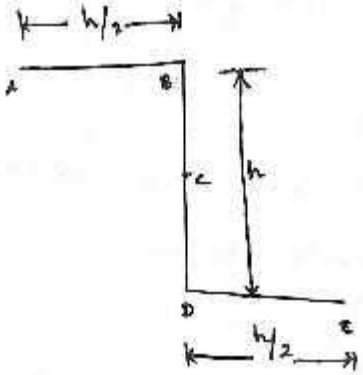
i) Derive the following formula e=3tf (b22 – b12)/htw + 6tf (b2 + b1). (4)

ii) Draw the shear flow diagram.

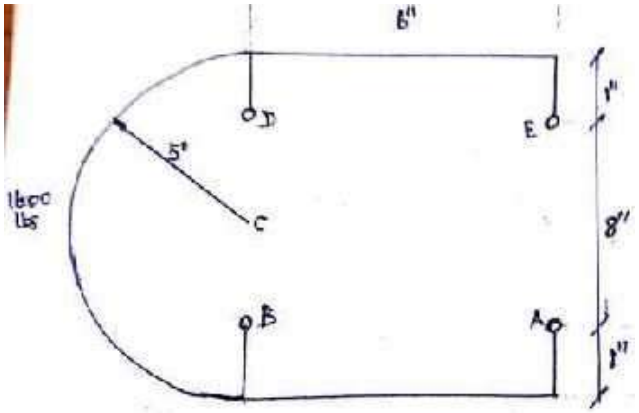


(OR)

(b) i) Calculate the shear flow distribution and assume the thickness is‘t’. (12)
ii) Locate the shear center. (4)

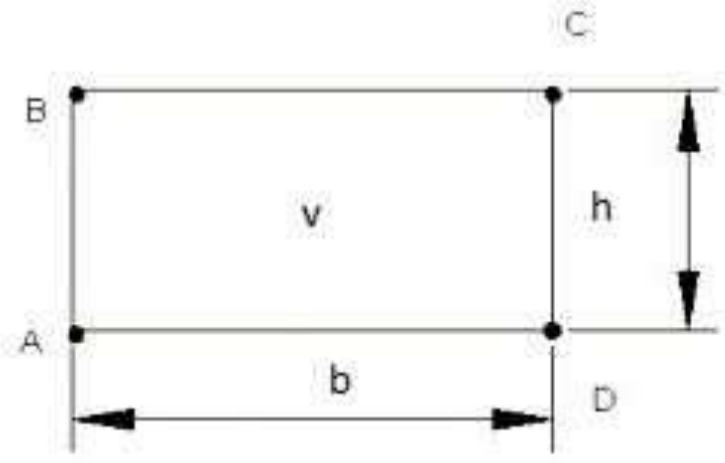


13. (a) i) Find the shear flow in the web alone. (12)
ii) Locate the shear center. (4)



(OR)

(b) i) Find the shear flow distribution for the section shown in figure. Assume (Area of each stinger is ‘a’ and shear load act at stinger B). (12)
ii) Sketch the shear flow diagram. (4)



14. (a) Determine the crippling load of a 6cm*9cm*4cm angle section column having effective length of 2.5m material used is steel with E = 210GPa. (16)

(OR)

(b) Elaborate the method to find crippling stress with example. (16)

15. (a) i) Explain briefly about the idealization of wing. (8)
ii) Draw the fuselage structure of the aircraft with neat Sketch. (8)

(OR)

(b) Describe about the V-n diagram. (16)