CBCS SCHEME

Sixth Semester B.E. Degree Examination, June/July 2024
Aircraft Structures - II

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a.   A beam having the cross, sectional is subjected to a bending moment of 1500Nm in a vertical plane. Calculate the maximum direct stress due to bending stating the point at which it acts.
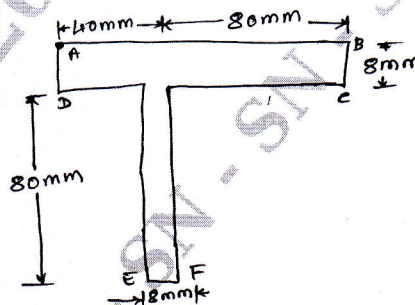

Fig Q1(a)   **(12 Marks)**

   b.   Derive the relationship between load intensity shear force and bending moment.   **(08 Marks)**

OR

2   a.   Define symmetrical bending. Write the assumptions of symmetrical bending.   **(08 Marks)**

   b.   Define unsymmetrical bending. Derive Euler Bernoulli equation for unsymmetrical bending.
(12 Marks)

Module-2

3   a.   Derive the equation for shear flow of open section beams.   **(08 Marks)**

   b.   Derive the displacement associated with the Bredt – Batho shear flow.   **(08 Marks)**

   c.   Explain shear centre with sketch and relevant equations.   **(04 Marks)**

OR

4   a.   Write the assumptions of Torsion, multicell wing subjected to pure torsion.   **(04 Marks)**

   b.   Discuss open and closed section of beams and prove that,

$$S_x \eta_0 - S_y \xi_0 = \phi q_0 p ds + 2A q_{s,0} - \sum_{r=1}^{m} P_{x,r} \eta_r + \sum_{r=1}^{m} P_{y,r} \varepsilon_r$$

(16 Marks)

Module-3

5   a.   Discuss the solution of a rectangular plate compressed uniformly by an airplane force N_x° along the edge x = 0 and x = a.   **(12 Marks)**

   b.   Explain Buckling and crippling stress and bring out the essential difference between them.
(08 Marks)

OR

6   a.   Explain, what all the design parameters to be considered when a material involves in Rivet joints.   **(10 Marks)**

   b.   What is meant by effective skin width, explain concept of effective width.   **(06 Marks)**

c. Why accuracy is vital in fitting analysis. Explain in detail. **(04 Marks)**

Module-4

7 a. Explain wide spread fatigues damage. **(08 Marks)**
   b. List the design criteria specifying the associate mode of failure data to be considered for aircraft structure. **(08 Marks)**
   c. How two – Bay crack is propagated, list the conditions to avoid two-Bay crack propagation. **(04 Marks)**

OR

8 a. Explain the structural idealization of a panel. **(10 Marks)**
   b. Explain the effect of structural idealization on the analysis of open and closed section of beam. **(10 Marks)**

Module-5

9 a. Explain the three boom shell structure in wings. **(10 Marks)**
   b. Explain the beams having variable stringer areas. **(10 Marks)**

OR

10 a. Why cut-out in fuselage is required? Explain the construction of fuselage frames. **(10 Marks)**
   b. Explain the principle of stiffeners construction with examples. **(10 Marks)**

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