CBCS SCHEME

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18AE62

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.

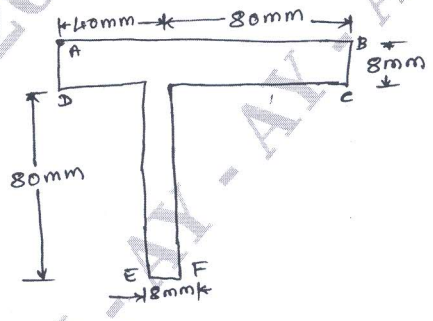

Fig Q1(a) **(12 Marks)**

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,

$$S_x \eta_0 - S_y \xi_0 = \phi q_{10} pds + 2Aq_{s,0} - \sum_{r=1}^{m} P_{x,r} \eta_r + \sum_{r=1}^{m} P_{y,r} \varepsilon_r$$ **(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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