

**B.Tech. AEROSPACE ENGINEERING
(BTAE)**

00691 Term-End Examination

June, 2019

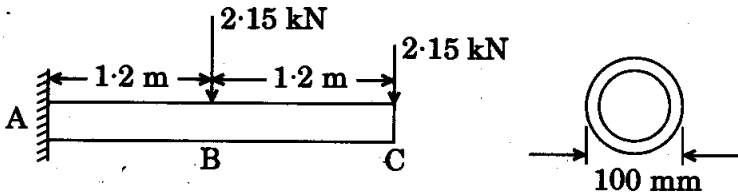
BAS-014 : AIRCRAFT STRUCTURES

Time : 3 hours

Maximum Marks : 70

Note : Answer any seven questions. All questions carry equal marks. Use of non-programmable calculator is permitted.

1. A steel pipe of 100 mm outer diameter is to support the loading as shown in the figure. Determine the minimum thickness of the pipe, if the allowable bending stress is 160 N/mm^2 . 10



2. Explain the various theories of failure in solids. 10
3. (a) In relation to aircraft structure, explain the term "torsion". 4
- (b) Explain three types of fuselage structure. 6

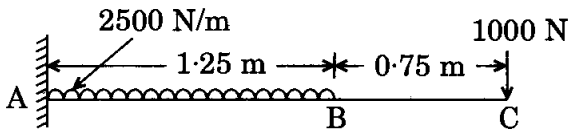
4. Explain the following briefly :

5×2=10

- (a) Endurance Limit
- (b) Poisson Ratio
- (c) Young's Modulus
- (d) Factor of Safety
- (e) Slenderness Ratio

5. A cantilever beam of length 2 m carries a uniformly distributed load of 2500 N per meter for a length of 1.25 m from the fixed end, and a point load of 1000 N at the free end. If the section is rectangular 120 mm side and 240 mm deep, find the deflection at the free end. Take $E = 10000 \text{ N/mm}^2$.

10



6. (a) What are the assumptions made in Euler's theory with reference to columns ?

3

(b) A mild steel tube 4 m long, 30 mm internal diameter and 4 mm thick is used as a strut with both ends hinged. Find the collapsing load. Take $E = 2.1 \times 10^5 \text{ N/mm}^2$.

7

7. Explain briefly the salient features of V-n diagram with the help of a neat diagram.

10

8. (a) A cylindrical boiler is 2.5 m in diameter and 20 mm in thickness and it carries steam at a pressure of 1.0 N/mm^2 . Find the stresses in the shell. 3
- (b) What are the advantages of a semi-monocoque fuselage? 4
- (c) What are the primary flight control surfaces of an aircraft? 3
9. Write short notes on the following :
- (a) Strain Gauges 5
- (b) Load Cells 5
10. Draw a stress-strain diagram for mild steel and discuss various important features. 10
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