Roll No. | | | | | | | | | | | | | Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(Aerospace Engg.) (2012 Onwards) (Sem.–4)

AEROSPACE STRUCTURES – I

Subject Code : ASPE-206

M.Code : 71530

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION–A

1. Answer briefly :

a) What do you mean by τ_{yx}?

b) Write equations of equilibrium for 2-D problem.

c) What is the angle between planes of maximum shear stress and principal planes?

d) Define strain energy of a member due to torsional load.

e) What is the significance of Castigliano's theorem?

f) What is the application of unit load method?

g) What is statically determinate truss?

h) Explain the term 'truss'.

i) What is Southwell plot?

j) What is equivalent length of a column?

SECTION-B

2. A structural member supports loads which produce, at a particular point, a direct tensile stress of 80 N/mm^2 and a shear stress of 45 N/mm^2 on the same plane. Calculate the values and directions of the principal stresses at the point and also the maximum shear stress, stating on which planes this will act.

3. Determine the forces in the truss shown below by method of joints.

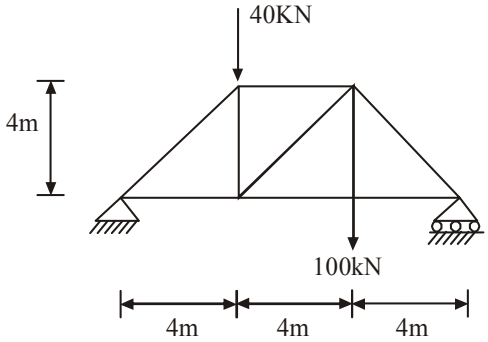

Fig.1

4. A cantilever is loaded at the tip as shown below. Obtain the value of deflection at the tip.

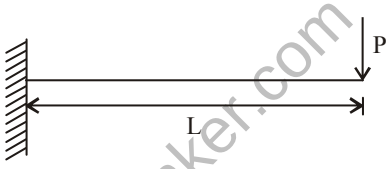

Fig.2

5. A column of length L has both ends fixed. It is loaded with a compressive load P. Determine the value of buckling load of the column.

6. Explain the salient features of structures of rockets, missiles and satellites.

SECTION-C

7. A cantilever 800 mm long with a prop 500 mm from the wall deflects in accordance with following observations when a point load of 40 N is applied at its end. 10

Distance (mm) :	0	100	200	300	400	500	600	700	800
Deflection (mm) :	0	–0.3	–1.4	–2.5	–1.9	0	2.3	4.8	10.6

What will be the angular rotation of the beam at the prop due to a 30 N load applied 200 mm from the wall, together with a 10 N load applied 350 mm from the wall?

8. Calculate the horizontal movement of the support D in the truss shown below. The cross-sectional area of each member is 1800 mm^2 and E = 2 × 10^5 N/mm^2. 10

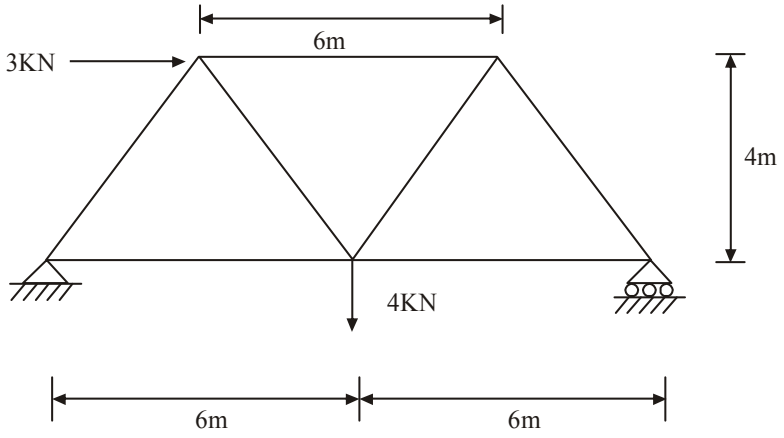

Fig.3

9. Explain the following :

a) Maximum stress theory 3

b) Maximum strain theory 3

c) Maximum shear stress theory 4

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.