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

Total No. of Questions : 09

B.Tech.(Aerospace Engg.) (2012 Batch) (Sem.–6)

AEROSPACE STRUCTURES-II

Subject Code : ASPE-312

M.Code : 72457

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION 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. Write briefly :

a) Define margin of safety and factor of safety.

b) What is inter-rivet buckling and sheet wrinkling?

c) What do you mean by effective width of a sheet?

d) What is two bay crack criteria?

e) Explain fatigue.

f) What is difference between structural design of a launch vehicle and an aircraft?

g) What is fitting factor and bearing factor?

h) What type of stresses are developed when a structure is subjected to torsion loads?

i) What is Bredt- Batho formula and write its expression.

j) What are characteristics of Wagner's beam?

SECTON-B

2. Draw V-n diagram of a typical airplane and explain all its salient features.

3. A beam is subjected to a pure bending moment M. Prove that direct stress due to M at any-point. 'y' in the beam is given by $\sigma_z = My/I$, where I is second moment of area of the cross section.

4. Calculate the position of the shear centre of the thin-walled channel section as shown in Fig 1. The thickness 't' of the walls is constant.

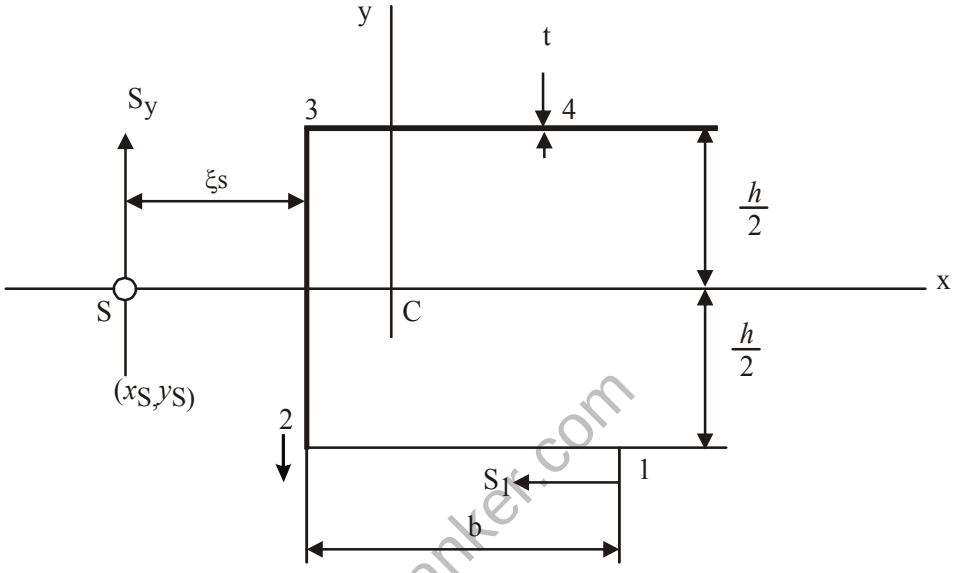

Fig 1

5. A thin-walled circular section beam has a diameter of 200 mm and is 2 m long; it is firmly restrained against rotation at each end. A concentrated torque of 30 kNm is applied to the beam at its mid-span point. If the maximum shear stress in the beam is limited to 200 N/mm^2 and the maximum angle of twist to 2°, calculate the minimum thickness of the beam walls. Take G = 25000 N/mm^2.

6. A rectangular stiffened flat plate is simply supported on all edges and is subjected to a compressive load of P/unit length. Obtain the expression for crippling stress by Needham's and Gerad's method.

SECTION-C

7. Determine the shear flow distribution in the web of the beam shown as below, at a section midway along its length. The web of the beam has a thickness of 2mm and is fully effectivein resisting direct stress. The beam tapers symmetrically about its horizontal centroidal axis and the cross sectional area of each flange is 400 mm^2.

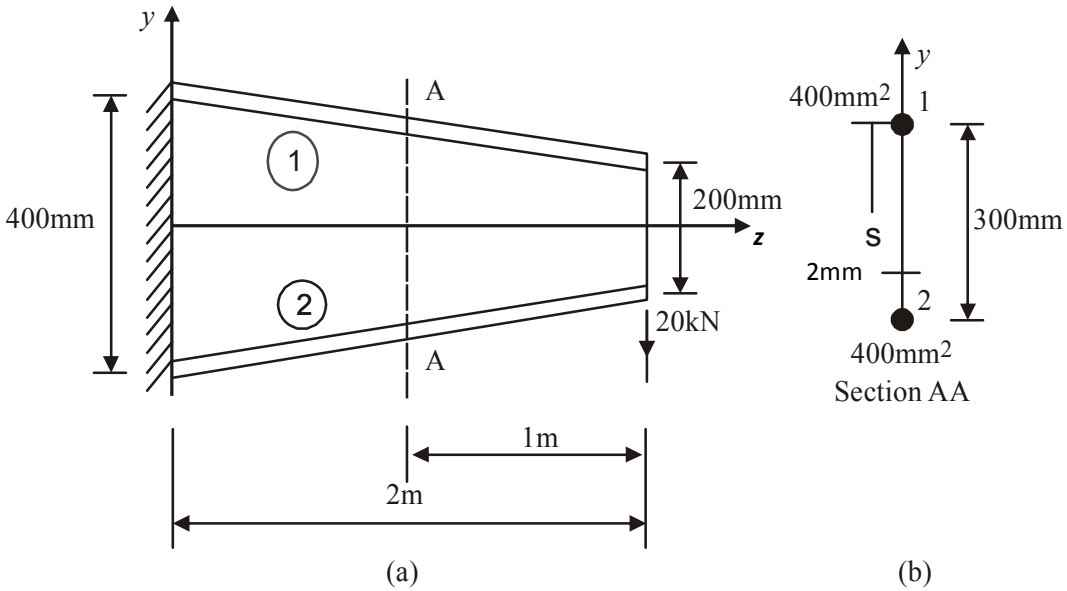

Fig 2

8. With the help of neat diagrams, explain theory of design of fittings and how fitting design loads are estimated? Also explain design procedure for riveted and welded joints.

9. Explain design principle, design criteria, analysis methods and life assessment procedure, widespread fatigue damage for aerospace structures.

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.