

**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**

**Paper ID : [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 has to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students has to attempt any **TWO** questions.

## SECTION-A

**1. Write briefly :**

- (a) Draw and label V–n diagram for a fighter airplane.
- (b) What is neutral axis of a beam?
- (c) What types of loads act on aircraft wing and tail plane?
- (d) Define shear centre and elastic axis.
- (e) Write the relation between torque and shear flow for a closed section beam.
- (f) How many boundary conditions are used to determine buckling load of a plate?
- (g) Differentiate between semi-tension field beam and full tension field beam.
- (h) Differentiate between factor of safety and margin of safety.
- (i) What are main design parameters for a fitting?
- (j) What do you mean by effective width?

### SECTION-B

2. Explain the design procedure for riveted and bolted joints and explain their relative merits and demerits.
3. What do you understand by fail-safe and safe-life structures? Which parts of aircraft are designed as fail-safe and safe-life structures and explain S-N curve for mild steel.
4. Describe with the help of suitable diagrams, inter rivet and sheet wrinkling failures.
5. Explain pure tension field beam and derive the expression for loads acting on stiffeners and flanges.
6. The cross-section of a beam has dimensions as shown below. If the beam is subjected to a negative bending moment of 100 k N-m applied in a vertical plane, determine the distribution of direct stress through the depth of the section.

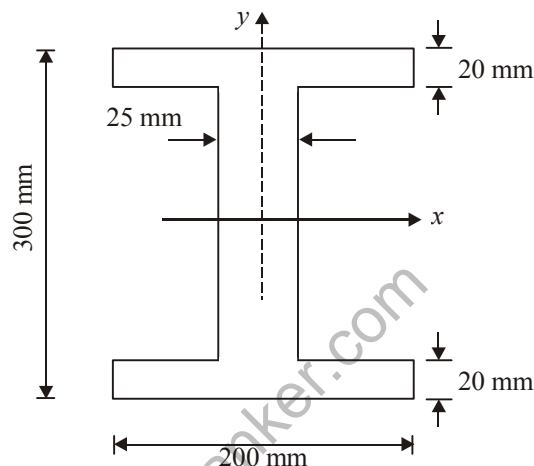


Fig.1

### SECTION-C

7. Determine the shear flow distributions in this walled Z-section shown below due to shear load  $S_y$  applied through shear centre of the section. (10)

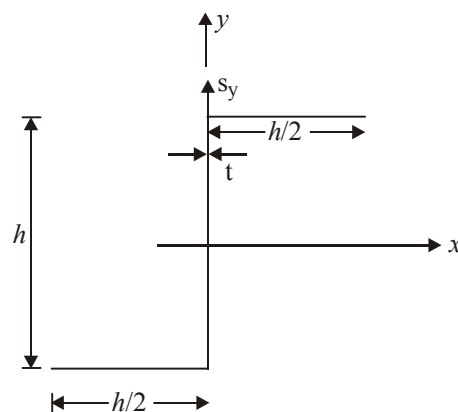


Fig.2

8. A rectangular plate  $a \times b \times t$  is subjected to compressive load  $N_x$  as shown below. All the four sides are simply supported. Obtain the value of buckling stress of the plate. (10)

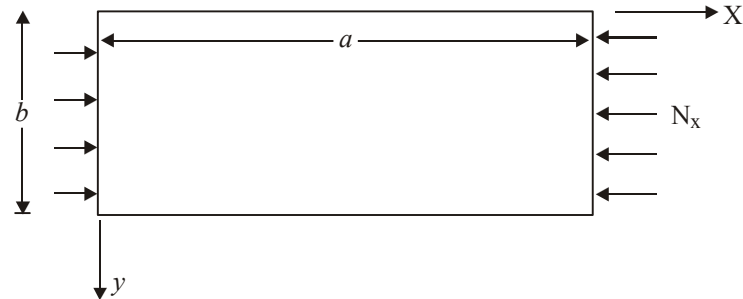


Fig. 3

9. Write notes on:
- (a) Life assessment procedure of aerospace structures (4)
  - (b) Estimation of fitting design loads (3)
  - (c) Two bay crack criteria. (3)