

Code No: R32212

**R10**
**Set No. 1**
**III B.Tech II Semester Supplementary Examinations, April - 2018**
**AEROSPACE VEHICLE STRUCTURES –II**

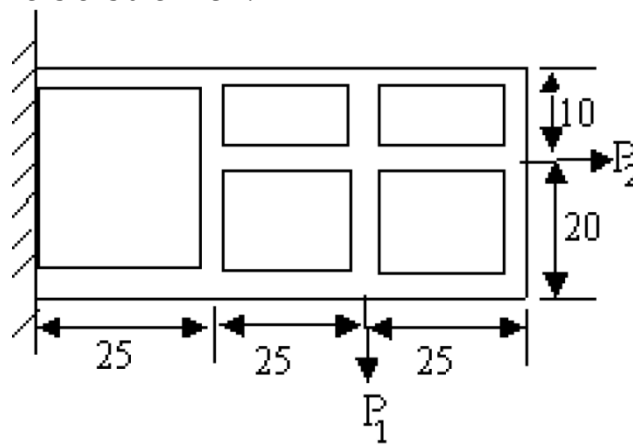
(Aeronautical Engineering)

**Time: 3 hours**
**Max. Marks: 75**

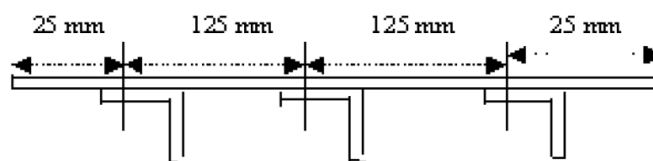
**Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Derive an expression for the angle of diagonal tension [5M]
- b) Find the shear flow in each web of the beam shown in the figure below. Plot the distribution of axial load along each stiffening member when  $P_1=25\text{kN}$ ,  $P_2=15\text{kN}$  All dimensions are in cm. [10M]



- 2 a) Define boom show some composite beams with boom, flanges and webs. [5M]
- b) A sheet panel 125mm - 320mm - 12mm has all edges simply supported. The panel is subjected to compression loads, which produce compressive stresses of  $1700 \text{ N/cm}^2$  applied normal to 125mm side. Will the sheet buckle under the given load system if made of Al alloy 2024-73 material. What is the margin of safety? [10M]
- 3 a) Explain different types of fuselage structures [5M]
- b) The sheet stringer panel  $250 \times 300 \times 1 \text{ mm}$ , shown in figure below is loaded in compression on the 300 mm side by means of rigid members. The sheet is assumed to be simply supported at the loaded ends and at the rivet lines and to be free at the sides. Each stringer has an area of  $65\text{mm}^2$ . Find total compressive load  $P$  for the following conditions. [10M]
  - i) When the sheet first buckles.
  - ii) When the structure stress  $FC$  is  $7000\text{N/cm}^2$ .



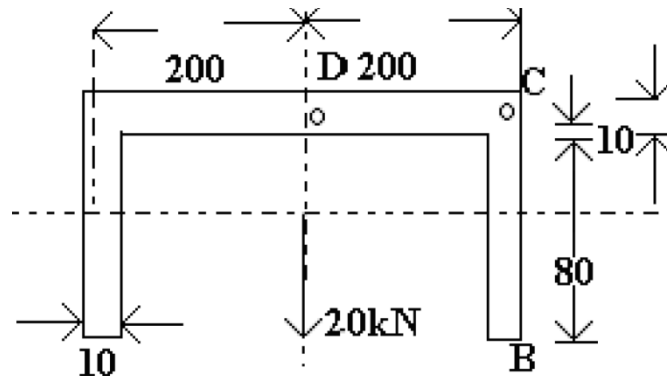
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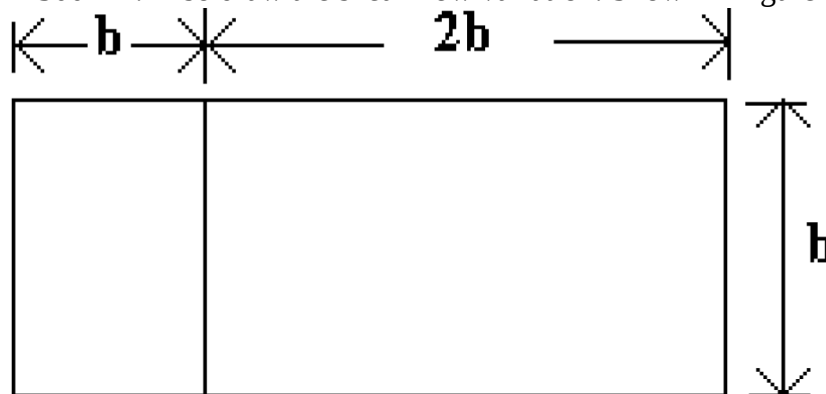
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- 4 a) Define the term Shear Flow? What is the unit of shear flow? [5M]  
b) A channel section is subjected to a shear of 20kN. Determine the shear flow at points B, C, D and plot the shear flow variation throughout the cross-section. Also calculate the resultant force in each region of the cross-section. Shown in figure below. [10M]



- 5 a) How do you understand about torsion bending phenomena? [5M]  
b) Thickness uniform locate the Shear Centre for the two compartment box beam  $t = 10\text{mm}$ ,  $b = 500\text{mm}$ . Also draw the shear flow variation. Shown in figure below. [10M]



- 6 a) What do you know about Effective walls & in effective walls? [5M]  
b) Explain the torsion of thin walled closed tubes subjected to twisting with the help of a neat sketch. [10M]  
7 a) Define warping? Explain Primary and Secondary warping of aircraft structures. [5M]  
b) Derive the expression for torsion bending constant for an open tube with channel cross section. [10M]  
8 a) What is lipping? How it is practiced in thin walled structures? [5M]  
b) Compute of improved specific torsion bending strength in lipped T-sections over the unlipped counter parts [10M]

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