Code No: R05322102 **R05** **Set No. 2**

III B.Tech II Semester Examinations,December 2010
AEROSPACE VECHILE STRUCTURESII
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain critical crippling load for extruded sections and bent sheet sections.
   (b) Find crippling stress of rectangular tubes shown in figure 1b using Nedham's method, when formed from aluminium. Uniform thickness, t = 1.5mm. [6+10]

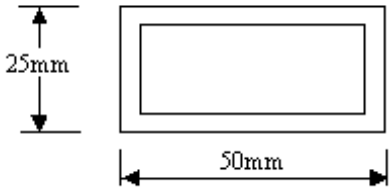

Figure 1b

2. (a) Explain primary and secondary instability, with suitable examples.
   (b) Determine the crippling stress of the panel, formed with hat-section stiffeners, as shown in figure 2b. Take σ_{cy}=470MPa and E=70GPa for stiffeners while σ_{cy}=280MPa. [4+12]

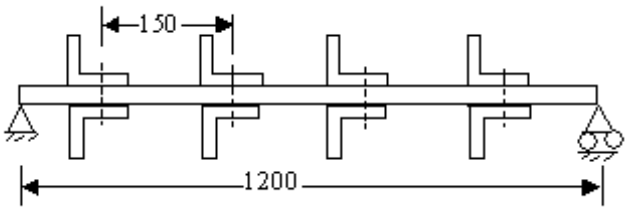

Figure 2b

3. Explain the torsion of thin walled closed tubes subjected to twisting with the help of a neat sketch. [16]

4. (a) What is buckling coefficient? Plot its variation for a thin rectangular plate, simply supported along its four edges, as a function of ratio of its sides
   (b) A straight uniform column of length 'L' and bending stiffness 'EI' is subjected to uniform lateral loading w/unit length shown in fig4b. The end attachments do not restrict rotation of the column ends. The longitudinal; compressive force 'P' has eccentricity 'e' from the centroids of the end sections and is placed so as to oppose the bending effect of the lateral loading. The eccentricity e can be varied and is to be adjusted to the value which, for given values of P and w, will result in the least maximum bending moment of the column. Show that $e = (w/Pa^2)\ \tan^2 aL/4$ where $a = P/EI$. [6+10]

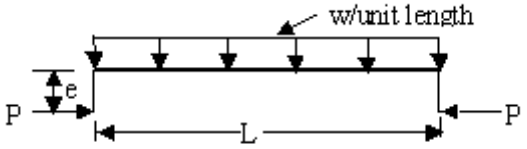

Figure 4b

5. Bending stress in a machine past fluctuates between a tensile stress of 280MPa and compressive stress of 140MPa. What should be the minimum ultimate tensile strength to carry this fluctuation I definitely according to:

   (a) Gerber's formula

   (b) Goodman's formula

   (c) Soderberg's formula. [16]

6. (a) Derive an expression for the angle of diagonal tension

   (b) Find the shear flow in each web of the beam shown in the figure 6b. Plot the distribution of axial load along each stiffening member when P_1=25kN, P_2=15kN All dimensions are in cm. [6+10]

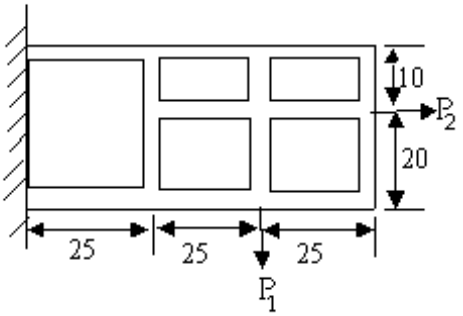

Figure 6b

7. A cross-section in the shape of a circular arc of uniform thickness is subtending An angle β from either side of the symmetrical axis. Shown in figure 7. That shear centre e=2R(sinβ- Rcosβ)/(R-sinβ.cosβ). [16]

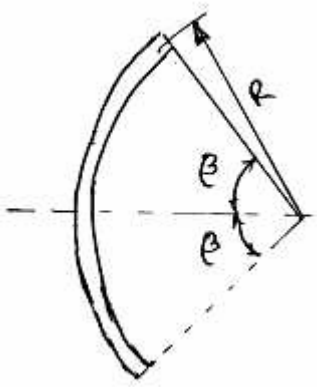

Figure 7

8. What are the factors that will influence wing structural arrangements? [16]

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Code No: R05322102 **R05** **Set No. 4**

III B.Tech II Semester Examinations,December 2010
AEROSPACE VECHILE STRUCTURESII
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Derive an expression for the angle of diagonal tension
   (b) Find the shear flow in each web of the beam shown in the figure 1b. Plot the distribution of axial load along each stiffening member when P_1=25kN, P_2=15kN All dimensions are in cm. [6+10]

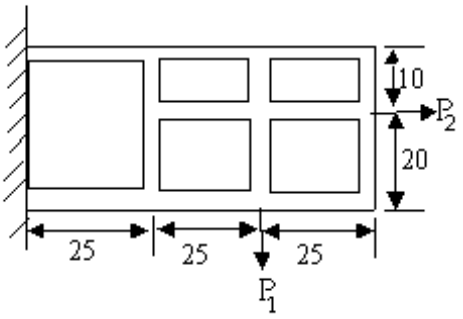

Figure 1b

2. (a) Explain critical crippling load for extruded sections and bent sheet sections.
   (b) Find crippling stress of rectangular tubes shown in figure 2b using Nedham's method, when formed from aluminium. Uniform thickness, t = 1.5mm. [6+10]

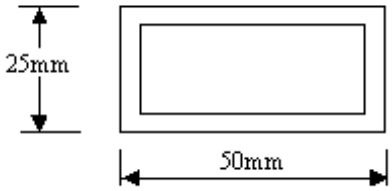

Figure 2b

3. Bending stress in a machine past fluctuates between a tensile stress of 280MPa and compressive stress of 140MPa. What should be the minimum ultimate tensile strength to carry this fluctuation I definitely according to:
   (a) Gerber's formula
   (b) Goodman's formula
   (c) Soderberg's formula. [16]

4. (a) Explain primary and secondary instability, with suitable examples.

(b) Determine the crippling stress of the panel, formed with hat-section stiffeners, as shown in figure 4b. Take σ_{cy}=470MPa and E=70GPa for stiffeners while σ_{cy}=280MPa. [4+12]

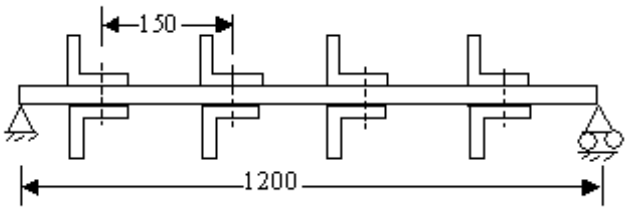

Figure 4b

5. (a) What is buckling coefficient? Plot its variation for a thin rectangular plate, simply supported along its four edges, as a function of ratio of its sides

(b) A straight uniform column of length 'L' and bending stiffness 'EI' is subjected to uniform lateral loading w/unit length shown in fig5b. The end attachments do not restrict rotation of the column ends. The longitudinal; compressive force 'P' has eccentricity 'e' from the centroids of the end sections and is placed so as to oppose the bending effect of the lateral loading. The eccentricity e can be varied and is to be adjusted to the value which, for given values of P and w, will result in the least maximum bending moment of the column. Show that e = $(w/Pa^2)\ \tan^2 aL/4$ where a = P/EI. [6+10]

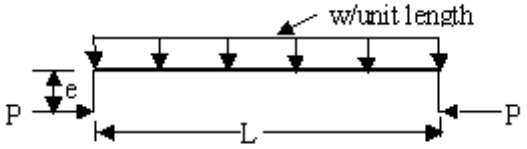

Figure 5b

6. A cross-section in the shape of a circular arc of uniform thickness is subtending An angle β from either side of the symmetrical axis. Shown in figure 6. That shear centre e=2R(sinβ- Rcosβ)/(R-sinβ.cosβ). [16]

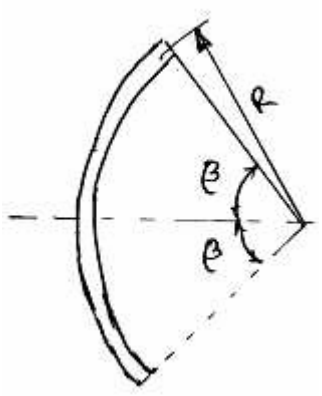

Figure 6

7. Explain the torsion of thin walled closed tubes subjected to twisting with the help of a neat sketch. [16]

8. What are the factors that will influence wing structural arrangements? [16]

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Code No: R05322102 **R05** **Set No. 1**

III B.Tech II Semester Examinations,December 2010
AEROSPACE VECHILE STRUCTURESII
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain critical crippling load for extruded sections and bent sheet sections.
   (b) Find crippling stress of rectangular tubes shown in figure 1b using Nedham's method, when formed from aluminium. Uniform thickness, t = 1.5mm. [6+10]

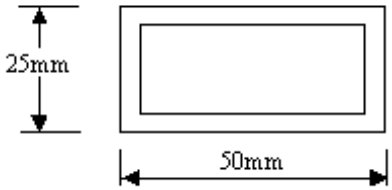

Figure 1b

2. What are the factors that will influence wing structural arrangements? [16]

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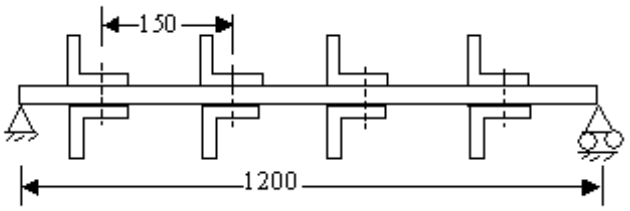

Figure 4b

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6. (a) What is buckling coefficient? Plot its variation for a thin rectangular plate, simply supported along its four edges, as a function of ratio of its sides

   (b) A straight uniform column of length 'L' and bending stiffness 'EI' is subjected to uniform lateral loading w/unit length shown in fig6b. The end attachments do not restrict rotation of the column ends. The longitudinal; compressive force 'P' has eccentricity 'e' from the centroids of the end sections and is placed so as to oppose the bending effect of the lateral loading. The eccentricity e can be varied and is to be adjusted to the value which, for given values of P and w, will result in the least maximum bending moment of the column. Show that $e = (w/Pa^2)\tan^2 aL/4$ where $a = P/EI$. [6+10]

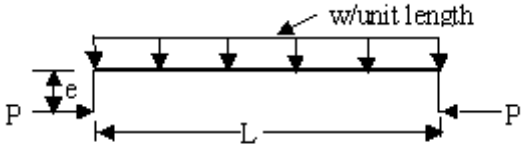

Figure 6b

7. A cross-section in the shape of a circular arc of uniform thickness is subtending An angle β from either side of the symmetrical axis. Shown in figure 7. That shear centre $e=2R(\sin\beta - R\cos\beta)/(R-\sin\beta.\cos\beta)$. [16]

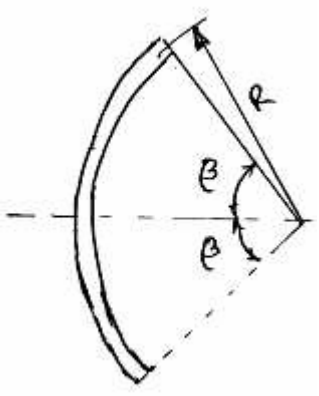

Figure 7

8. (a) Derive an expression for the angle of diagonal tension

   (b) Find the shear flow in each web of the beam shown in the figure 8b. Plot the distribution of axial load along each stiffening member when P_1=25kN, P_2=15kN All dimensions are in cm. [6+10]

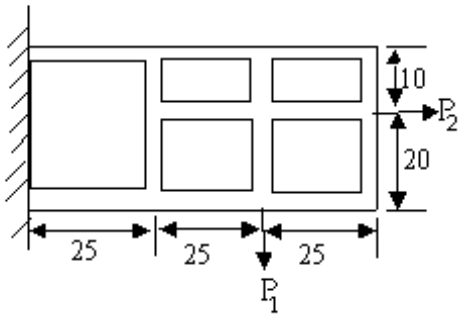

Figure 8b

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Code No: R05322102 **R05** **Set No. 3**

III B.Tech II Semester Examinations,December 2010
AEROSPACE VECHILE STRUCTURESII
Aeronautical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain primary and secondary instability, with suitable examples.
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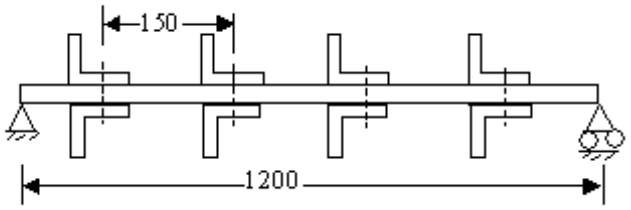

Figure 1b

2. Explain the torsion of thin walled closed tubes subjected to twisting with the help of a neat sketch. [16]

3. (a) What is buckling coefficient? Plot its variation for a thin rectangular plate, simply supported along its four edges, as a function of ratio of its sides
   (b) A straight uniform column of length 'L' and bending stiffness 'EI' is subjected to uniform lateral loading w/unit length shown in fig3b. The end attachments do not restrict rotation of the column ends. The longitudinal; compressive force 'P' has eccentricity 'e' from the centroids of the end sections and is placed so as to oppose the bending effect of the lateral loading. The eccentricity e can be varied and is to be adjusted to the value which, for given values of P and w, will result in the least maximum bending moment of the column. Show that e = (w/Pa^2) tan^{2}aL/4 where a = P/EI. [6+10]

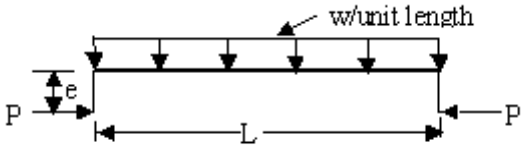

Figure 3b

4. Bending stress in a machine past fluctuates between a tensile stress of 280MPa and compressive stress of 140MPa. What should be the minimum ultimate tensile strength to carry this fluctuation I definitely according to:
   (a) Gerber's formula

(b) Goodman's formula

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(b) Find crippling stress of rectangular tubes shown in figure 5b using Nedham's method, when formed from aluminium. Uniform thickness, t = 1.5mm. [6+10]

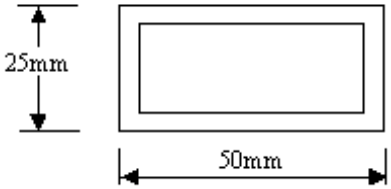

Figure 5b

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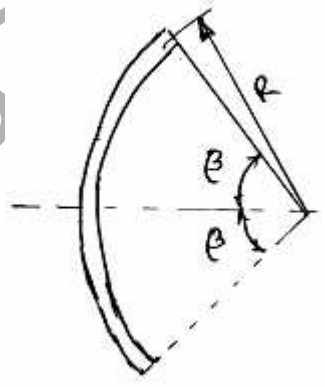

Figure 7

8. (a) Derive an expression for the angle of diagonal tension

(b) Find the shear flow in each web of the beam shown in the figure 8b. Plot the distribution of axial load along each stiffening member when P_1=25kN, P_2=15kN All dimensions are in cm. [6+10]

Code No: R05322102 **R05** **Set No. 3**

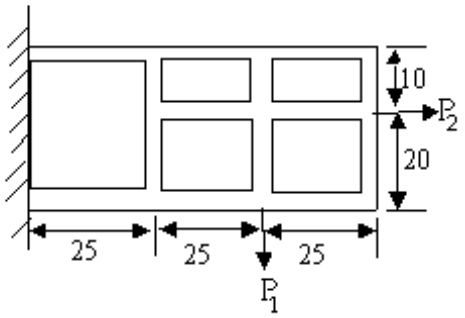

Figure 8b

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