Code No: R05312104 **R05** **Set No. 2**

III B.Tech I Semester Examinations,November 2010
AEROSPACE VEHICLE STRUCTURES-I
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Name the two methods based on matrix method which are used for structural analysis and explain them briefly.
   (b) Determine the stiffness matrix for the system shown in figure 2b [6+10]

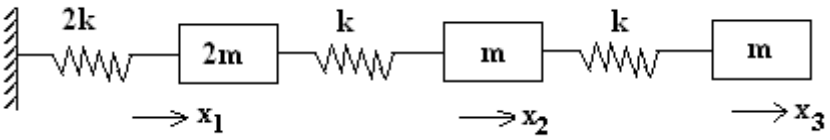

Figure 2b

2. Derive the expression for bending stresses for a beam with unsymmetrical cross-section. [16]

3. A shaft is loaded with two torques as shown in figure 3. Determine the maximum stress in the shaft by Rayleigh Ritz Method. [16]

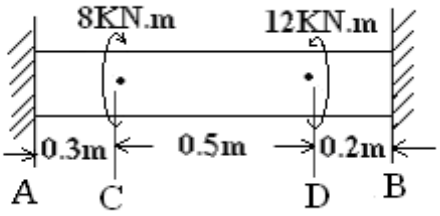

Figure 3

4. A pin jointed strut carries a UDL . of intensity 'w' per unit length and an eccentric axial load P at an eccentricity of 'e' as shown in figure 7. Find the deflection at mid span of the strut. [16]

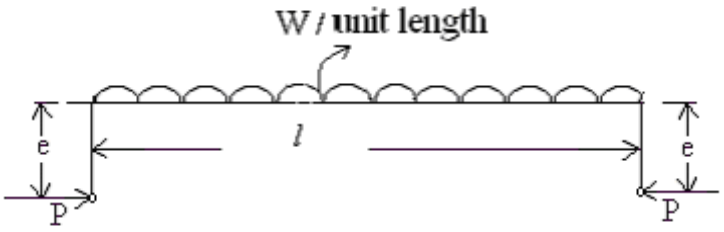

Figure 7

5. For the indeterminate beam as shown in figure4, find the redundant reaction. [16]

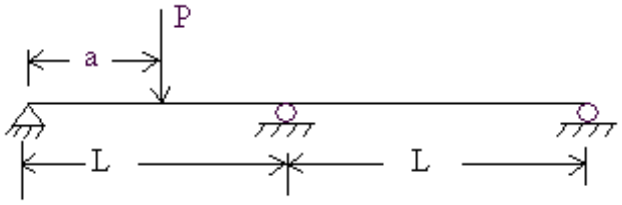

Figure 4

6. A bar of rectangular section 40 mm × 50 mm and hinged at both ends is subjected to axial compressive force. For the material of the bar , E = 200 G Pa and limit of proportionality 250 M Pa. Calculate the minimum length of the bar for which Euler's theory may be used. [16]

7. Find the central deflection of a simply supported beam shown in figure 8 by unit load method and loaded at a point distant 'a' from A and 'b' from B. [16]

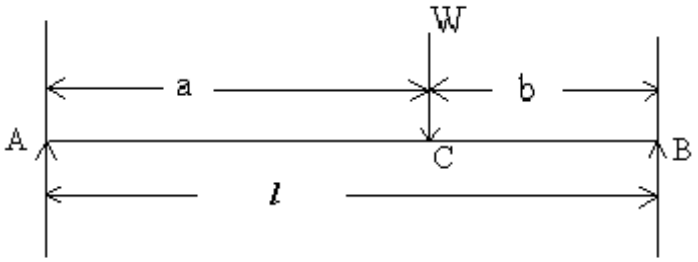

Figure 8

8. A cantilever beams 120 mm wide and 200 mm deep is 2.5 m long. What uniformly distributed load should the beam carry to produce a deflection of 5 mm at the free end and what concentrated load at free end would produce the same deflection . Give the slope at the free end in both the cases. Ignore the self weight of the beam take$E = 2 \times 10^5 N/mm^2$. [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: R05312104 **R05** **Set No. 4**

III B.Tech I Semester Examinations,November 2010
AEROSPACE VEHICLE STRUCTURES-I
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. For the indeterminate beam as shown in figure4, find the redundant reaction. [16]

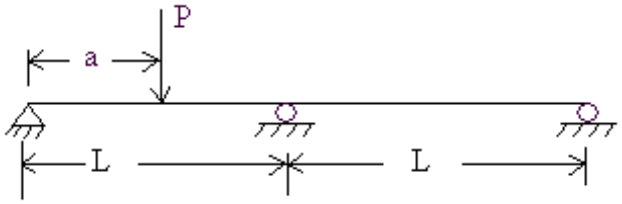

Figure 4

2. A pin jointed strut carries a UDL of intensity 'w' per unit length and an eccentric axial load P at an eccentricity of 'e' as shown in figure 7. Find the deflection at mid span of the strut. [16]

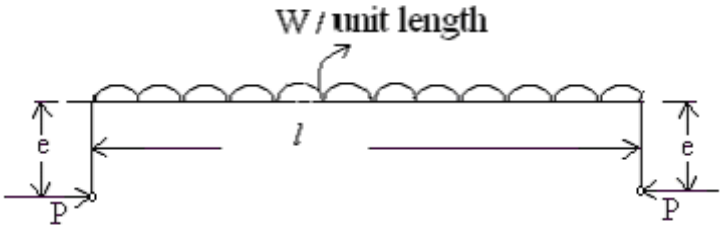

Figure 7

3. Find the central deflection of a simply supported beam shown in figure 8 by unit load method and loaded at a point distant 'a' from A and 'b' from B. [16]

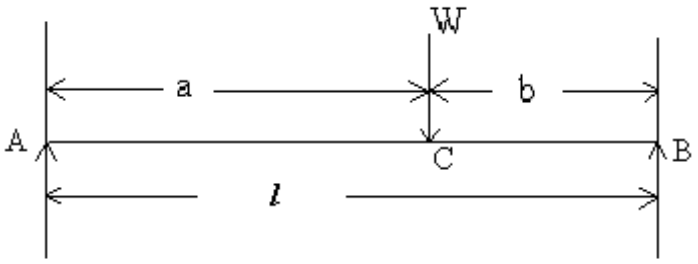

Figure 8

4. A shaft is loaded with two torques as shown in figure 3. Determine the maximum stress in the shaft by Rayleigh Ritz Method. [16]

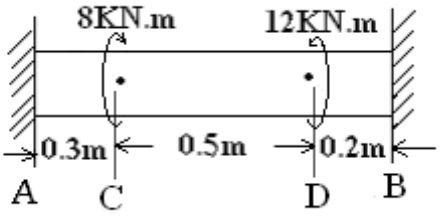

Figure 3

5. A bar of rectangular section 40 mm × 50 mm and hinged at both ends is subjected to axial compressive force. For the material of the bar , E = 200 G Pa and limit of proportionality 250 M Pa. Calculate the minimum length of the bar for which Euler's theory may be used. [16]

6. Derive the expression for bending stresses for a beam with unsymmetrical cross-section. [16]

7. A cantilever beams 120 mm wide and 200 mm deep is 2.5 m long. What uniformly distributed load should the beam carry to produce a deflection of 5 mm at the free end and what concentrated load at free end would produce the same deflection . Give the slope at the free end in both the cases. Ignore the self weight of the beam take$E = 2 \times 10^5 N/mm^2$. [16]

8. (a) Name the two methods based on matrix method which are used for structural analysis and explain them briefly.
   (b) Determine the stiffness matrix for the system shown in figure 2b [6+10]

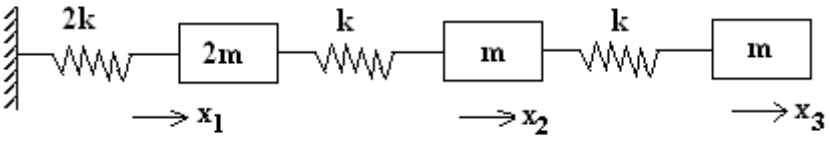

Figure 2b

⋆ ⋆ ⋆ ⋆ ⋆

Code No: R05312104 **R05** **Set No. 1**

III B.Tech I Semester Examinations,November 2010
AEROSPACE VEHICLE STRUCTURES-I
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. For the indeterminate beam as shown in figure4, find the redundant reaction. [16]

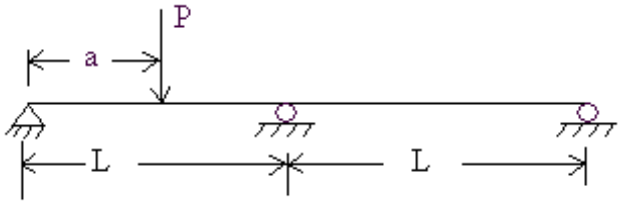

Figure 4

2. A bar of rectangular section 40 mm × 50 mm and hinged at both ends is subjected to axial compressive force. For the material of the bar , E = 200 G Pa and limit of proportionality 250 M Pa. Calculate the minimum length of the bar for which Euler's theory may be used. [16]

3. A shaft is loaded with two torques as shown in figure 3. Determine the maximum stress in the shaft by Rayleigh Ritz Method. [16]

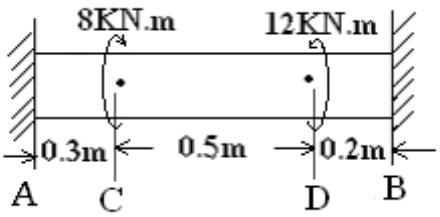

Figure 3

4. A cantilever beams 120 mm wide and 200 mm deep is 2.5 m long. What uniformly distributed load should the beam carry to produce a deflection of 5 mm at the free end and what concentrated load at free end would produce the same deflection . Give the slope at the free end in both the cases. Ignore the self weight of the beam take$E = 2 \times 10^5 N/mm^2$. [16]

5. A pin jointed strut carries a UDL. of intensity 'w' per unit length and an eccentric axial load P at an eccentricity of 'e' as shown in figure 7. Find the deflection at mid span of the strut. [16]

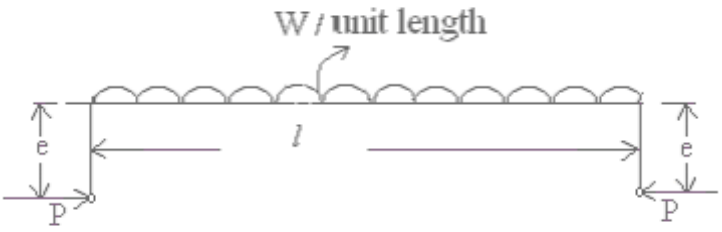

Figure 7

6. Derive the expression for bending stresses for a beam with unsymmetrical cross-section. [16]

7. Find the central deflection of a simply supported beam shown in figure 8 by unit load method and loaded at a point distant 'a' from A and 'b' from B. [16]

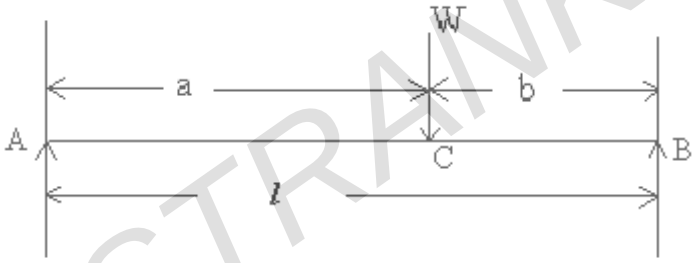

Figure 8

8. (a) Name the two methods based on matrix method which are used for structural analysis and explain them briefly.

   (b) Determine the stiffness matrix for the system shown in figure 2b [6+10]

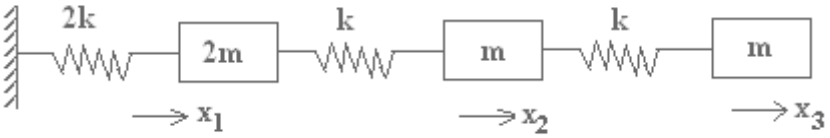

Figure 2b

⋆ ⋆ ⋆ ⋆ ⋆

Code No: R05312104 **R05** **Set No. 3**

III B.Tech I Semester Examinations,November 2010
AEROSPACE VEHICLE STRUCTURES-I
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. Derive the expression for bending stresses for a beam with unsymmetrical cross-section. [16]

2. (a) Name the two methods based on matrix method which are used for structural analysis and explain them briefly.
   (b) Determine the stiffness matrix for the system shown in figure 2b [6+10]

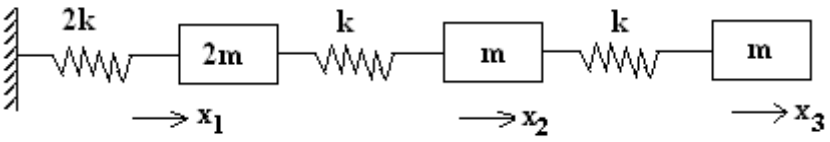

Figure 2b

3. A shaft is loaded with two torques as shown in figure 3. Determine the maximum stress in the shaft by Rayleigh Ritz Method. [16]

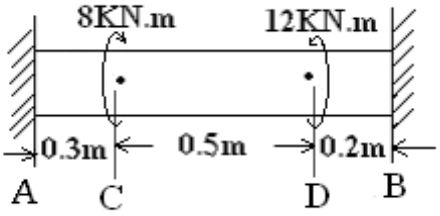

Figure 3

4. For the indeterminate beam as shown in figure4, find the redundant reaction. [16]

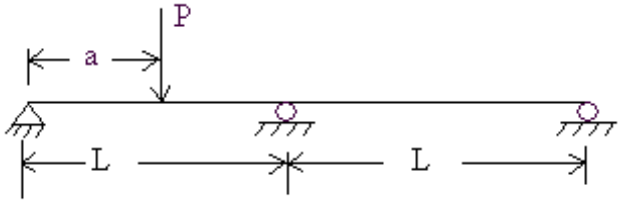

Figure 4

5. A cantilever beams 120 mm wide and 200 mm deep is 2.5 m long. What uniformly distributed load should the beam carry to produce a deflection of 5 mm at the free end and what concentrated load at free end would produce the same deflection . Give the slope at the free end in both the cases. Ignore the self weight of the beam take$E = 2 \times 10^5 N/mm^2$. [16]

6. A bar of rectangular section 40 mm × 50 mm and hinged at both ends is subjected to axial compressive force. For the material of the bar , E = 200 G Pa and limit of proportionality 250 M Pa. Calculate the minimum length of the bar for which Euler's theory may be used. [16]

7. A pin jointed strut carries a UDL of intensity 'w' per unit length and an eccentric axial load P at an eccentricity of 'e' as shown in figure 7. Find the deflection at mid span of the strut. [16]

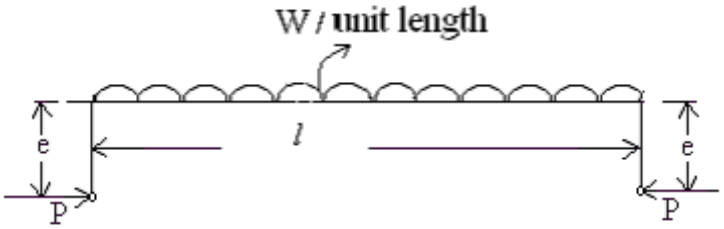

Figure 7

8. Find the central deflection of a simply supported beam shown in figure 8 by unit load method and loaded at a point distant 'a' from A and 'b' from B. [16]

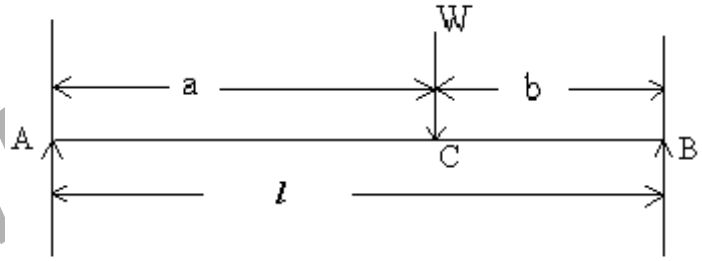

Figure 8

⋆ ⋆ ⋆ ⋆ ⋆