Code No: 07A52103 **R07** **Set No. 2**

III B.Tech I Semester Examinations,December 2011
AEROSPACE VECHICLE STRUCTURES-I
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain strain energy and complementary energy.
   (b) Find deflection at free end of the cantilever beam length l subjected to u d l w KN/m throughout the beam by energy method. [8+8]

2. Two planes AB and BC which are at right angles carry shear stresses of intensity 17.5N/mm^2 while these planes also carry a tensile stress of 70N/mm^2 and a compressive stress of 35N/mm^2 respectively. Determine the principal planes and the principal stresses. Also determine the maximum shear stress and the planes of which it acts. [16]

3. An infinitely long steel beam 100 mm wide and 150 mm thick is resting on an elastic foundation whose modulus of foundation is 10.50N/mm^2. The beam is subjected to uniformly distributed load of intensity 10 N/m over a length of 400 mm. Determine the deflection and stresses at a point at mid length of this load and at two locations 100 mm to the left and 200 mm to the right of this load. [16]

4. A beam loaded as shown in figure 1. The moment of Inertia of the beam is span AB is 'I' and that in span BC is 2I. Draw the SFD and BMD of the beam. [16]

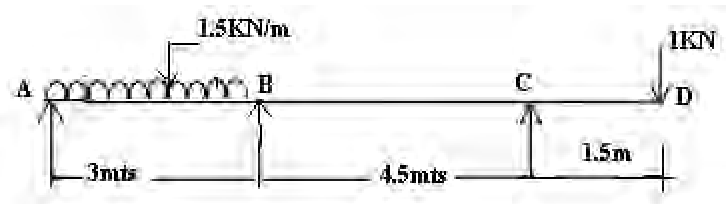

Figure 1:

5. A bar length 4 m is used as a simply supported beam and subjected to a uniformly distributed load of 30kN/m over the whole span, it deflects 15 mm at the center. Determine the crippling load when it is used as a column with the following end conditions.
   (a) both ends pin joined
   (b) one end fixed and the other hinged
   (c) both ends fixed. [16]

6. (a) Derive equations of equilibrium in polar coordinates.
   (b) Derive compatibility equations. [8+8]

7. Find the frequency of the spring shown in figure 2: [16]

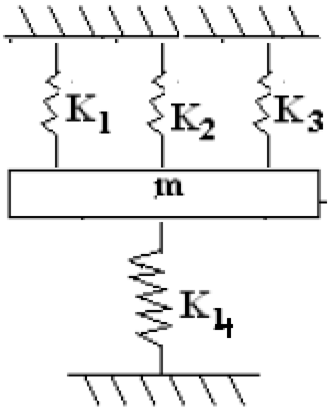

Figure 2

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

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Code No: 07A52103 **R07** **Set No. 4**

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AEROSPACE VECHICLE STRUCTURES-I
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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

2. (a) Explain strain energy and complementary energy.
   (b) Find deflection at free end of the cantilever beam length l subjected to u d l w KN/m throughout the beam by energy method. [8+8]

3. A bar length 4 m is used as a simply supported beam and subjected to a uniformly distributed load of 30kN/m over the whole span, it deflects 15 mm at the center. Determine the crippling load when it is used as a column with the following end conditions.
   (a) both ends pin joined
   (b) one end fixed and the other hinged
   (c) both ends fixed. [16]

4. (a) Derive equations of equilibrium in polar coordinates.
   (b) Derive compatibility equations. [8+8]

5. Two planes AB and BC which are at right angles carry shear stresses of intensity 17.5N/mm^2 while these planes also carry a tensile stress of 70N/mm^2 and a compressive stress of 35N/mm^2 respectively. Determine the principal planes and the principal stresses. Also determine the maximum shear stress and the planes of which it acts. [16]

6. An infinitely long steel beam 100 mm wide and 150 mm thick is resting on an elastic foundation whose modulus of foundation is 10.50N/mm^2. The beam is subjected to uniformly distributed load of intensity 10 N/m over a length of 400 mm. Determine the deflection and stresses at a point at mid length of this load and at two locations 100 mm to the left and 200 mm to the right of this load. [16]

7. A beam loaded as shown in figure 3. The moment of Inertia of the beam is span AB is 'I' and that in span BC is 2I. Draw the SFD and BMD of the beam. [16]

8. Find the frequency of the spring shown in figure 4: [16]

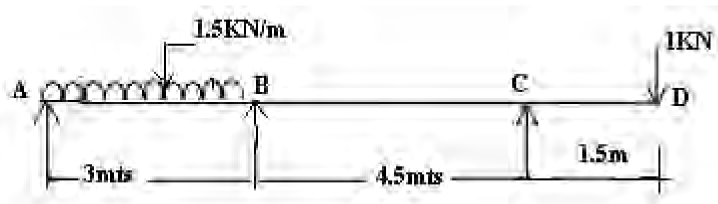

Figure 3

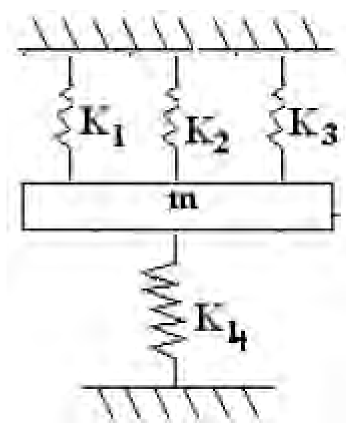

Figure 4

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Code No: 07A52103 **R07** **Set No. 1**

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AEROSPACE VECHICLE STRUCTURES-I
Aeronautical Engineering

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

Answer any FIVE Questions
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1. A beam loaded as shown in figure 5. The moment of Inertia of the beam is span AB is 'I' and that in span BC is 2I. Draw the SFD and BMD of the beam. [16]

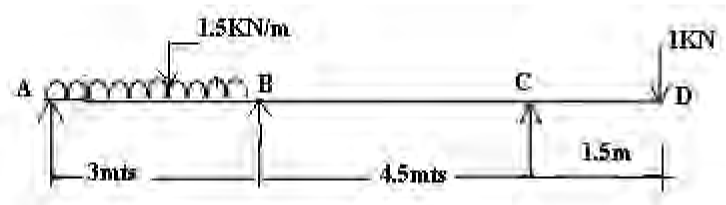

Figure 5:

2. (a) Derive equations of equilibrium in polar coordinates.
   (b) Derive compatibility equations. [8+8]

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

4. (a) Explain strain energy and complementary energy.
   (b) Find deflection at free end of the cantilever beam length l subjected to u d l w KN/m throughout the beam by energy method. [8+8]

5. Two planes AB and BC which are at right angles carry shear stresses of intensity 17.5N/mm^2 while these planes also carry a tensile stress of 70N/mm^2 and a compressive stress of 35N/mm^2 respectively. Determine the principal planes and the principal stresses. Also determine the maximum shear stress and the planes of which it acts. [16]

6. Find the frequency of the spring shown in figure 6: [16]

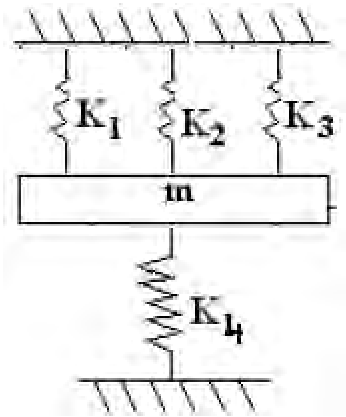

Figure 6:

7. An infinitely long steel beam 100 mm wide and 150 mm thick is resting on an elastic foundation whose modulus of foundation is 10.50N/mm^2. The beam is subjected to uniformly distributed load of intensity 10 N/m over a length of 400 mm. Determine the deflection and stresses at a point at mid length of this load and at two locations 100 mm to the left and 200 mm to the right of this load. [16]

8. A bar length 4 m is used as a simply supported beam and subjected to a uniformly distributed load of 30kN/m over the whole span, it deflects 15 mm at the center. Determine the crippling load when it is used as a column with the following end conditions.
   (a) both ends pin joined
   (b) one end fixed and the other hinged
   (c) both ends fixed. [16]

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Code No: 07A52103 **R07** **Set No. 3**

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AEROSPACE VECHICLE STRUCTURES-I
Aeronautical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆⋆⋆⋆⋆

1. (a) Derive equations of equilibrium in polar coordinates.
   (b) Derive compatibility equations. [8+8]
2. Explain the torsion of thin walled closed tubes subjected to twisting with the help of a neat sketch. [16]
3. Find the frequency of the spring shown in figure 7: [16]

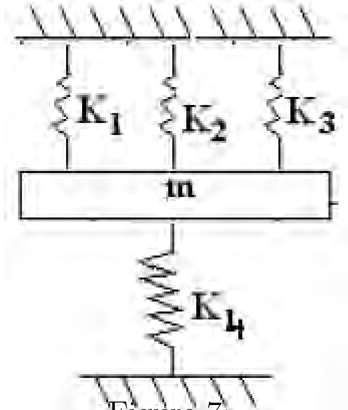

Figure 7:

4. A beam loaded as shown in figure 8. The moment of Inertia of the beam is span AB is 'I' and that in span BC is 2I. Draw the SFD and BMD of the beam. [16]

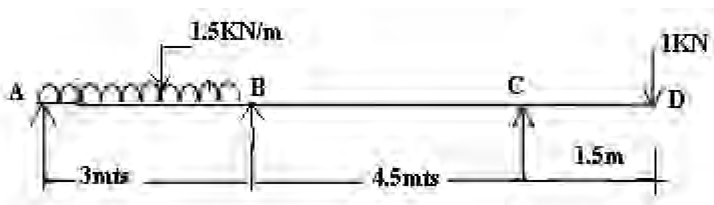

Figure 8:

5. Two planes AB and BC which are at right angles carry shear stresses of intensity 17.5N/mm^2 while these planes also carry a tensile stress of 70N/mm^2 and a compressive stress of 35N/mm^2 respectively. Determine the principal planes and the principal stresses. Also determine the maximum shear stress and the planes of which it acts. [16]

6. An infinitely long steel beam 100 mm wide and 150 mm thick is resting on an elastic foundation whose modulus of foundation is 10.50N/mm^2. The beam is subjected to uniformly distributed load of intensity 10 N/m over a length of 400 mm. Determine the deflection and stresses at a point at mid length of this load and at two locations 100 mm to the left and 200 mm to the right of this load. [16]

7. (a) Explain strain energy and complementary energy.
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8. A bar length 4 m is used as a simply supported beam and subjected to a uniformly distributed load of 30kN/m over the whole span, it deflects 15 mm at the center. Determine the crippling load when it is used as a column with the following end conditions.
   (a) both ends pin joined
   (b) one end fixed and the other hinged
   (c) both ends fixed. [16]

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