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**BAS-008**

**B.Tech. (AEROSPACE ENGINEERING)  
(BTAE)**

**Term-End Examination, 2019**

**BAS-008 : STRENGTH OF MATERIALS**

**Time : 3 Hours]**

**[Maximum Marks : 70**

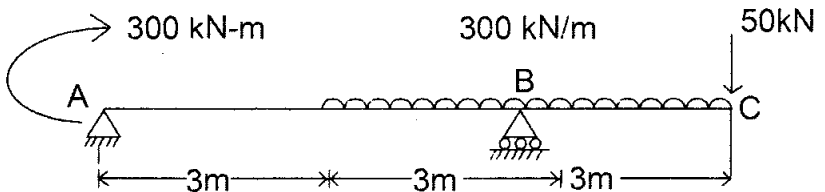
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**Note : Attempt any seven questions. All questions carry equal marks. Use of scientific calculator is permitted.**

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1. (a) Draw a neat sketch of Stress-Strain curve for a mild steel specimen in tension. Mark the salient points on it. [4]
- (b) Derive the relationship between Young's modulus, and Bulk modulus of a material. [6]
2. Define **any four** of the following : [2.5x4=10]
  - (a) Potential Energy
  - (b) Strain Energy
  - (c) Compressive Force
  - (d) Thermal Stress
  - (e) Moment of Inertia

3. A 1.5 m long steel bar having uniform diameter of 20 mm for a length of 1 m, gradually redness to 10 mm over the next 0.5 m. Determine the elongation of the bar when subjected to an axial tensile load of 80 kN. Take  $E = 200$  GPa. [10]
4. For the beam shown in figure below, draw the shear force and bending moment diagram. Mark the values at salient points : [10]



5. (a) Differentiate between open coiled and closely coiled helical springs. [4]
- (b) Derive the Torsion equation. [6]
6. A rectangular block of a material is subjected to tensile stresses of  $120 \text{ N/mm}^2$  and  $60 \text{ N/mm}^2$  on mutually perpendicular planes together with a shear stress of  $70 \text{ N/mm}^2$ . [10]

Find :

- (a) Principal stresses.
  - (b) Principal planes.
  - (c) Maximum shear stress
7. A rolled steel joint of I section used as a simply supported beam has the following dimensions : Flange (250x25) mm, Web 15 mm thick, Depth 50 mm.
- If this beam carries a UDL of 50 kN/m on a span of 4m, calculate the maximum stress produced due to bending.
- [10]
8. (a) Explain the term "Beam of Uniform Strength" with the help of neat sketches. [5]
- (b) Derive the relationship between Intensity of load, Shear Force and Bending Moment. [5]
9. (a) Explain **any two** of the following : [2x3=6]
- (i) Neutral Axis
  - (ii) Flexural Rigidity
  - (iii) Section modulus
- (b) Show that the maximum bending moment in a beam subjected to Udl ( $w$ ) throughout span( $l$ ) is  $wl^2/8$ . [4]

10. (a) Briefly describe the limitations of Euler's formula. [5]
- (b) Explain buckling load and Slenderness ratio. [5]

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