Code No: R21213 **R10** SET - 1

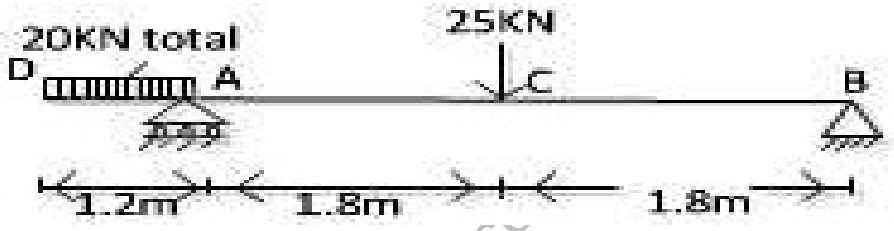
II B. Tech I Semester Supplementary Examinations, Oct/Nov - 2017
FOUNDATION OF SOLID MECHANICS
(Aeronautical Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~

1. a) Define the terms: resilience, elastic limit, yield point and elastic moduli. (8M)
   b) A metallic bar 300 mm x 100 mm x 40 mm is subjected to a force of 5 kN (tensile), 6 kN (tensile) and 4 kN (tensile) along x, y and z directions respectively. Determine the change in the volume of the block. Take E = 2 x 10^5 N/mm^2 and Poission's ratio = 0.25. (7M)

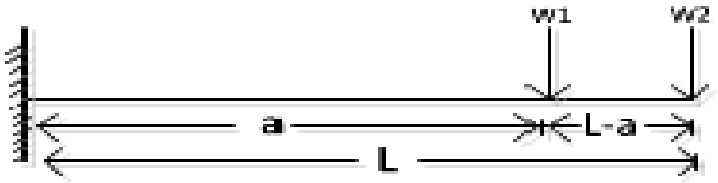
2. Draw the shear force and bending moment diagrams for the beam shown in the figure: (15M)



3. Define Neutral axis. Sketch the bending stress distribution across the cross section of a rectangular beam section 230 x 400 m subjected to 60 kNm moment. (15M)

4. A beam of triangular section is having its base b and height h. it is placed with its base horizontal. If at a certain section of the beam, the shear force is F, (15M)
   (i) Find the maximum shear stress
   (ii) Shear stress at the neutral axis.
   Draw the shear stress distribution curve.

5. Find the displacement at free end of the cantilever shown in the figure. Find its numerical value if L=3m, a=2m, W_1=20KN, W_2=30KN, E=2 x 10^5 N/mm^2 and I=2 x 10^8 mm^4. (15M)


~~~~~~~~~~~~~~~~~~~~~~~~

Code No: R21213 **R10** SET - 1

6. A cylindrical shell 1.2m long, 200mm internal diameter and 10mm thick is filled with a fluid at atmospheric pressure. If an additional 3 X 10^4 mm^3 of the fluid is pumped into the cylinder, find the pressure exerted by the fluid on the wall of the cylinder. Find also the hoop stress induced. Take E = 2 X 10^5 N/mm^2, $\mu = 0.3$. (15M)

7. a) What are various modes of failure of a riveted joint? (7M)
   b) Define and differentiate pitch and gauge for a riveted joint. (8M)

8. a) When unsymmetrical bending does takes place? Define principle axis of a section and give an expression to determine it. (7M)
   b) Explain the neutral axis method of bending stress determination when an arbitrary section is subjected to bending moments Mx and My. (8M)