[6359]-502

S.E. (Civil) (Insem)
MECHANICS OF STRUCTURES
(2019 Pattern) (Semester - III) (201002)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:
1) *Answer Q.1 or Q.2, Q.3 or Q.4.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if necessary.*
5) *Use of non programmable electronic calculator is allowed.*

Q1) a) A steel bar of 20mm diameter is loaded as shown in figure 1. Determine the stresses in each part and the total elongation. Take E = 210 GPa.**[8]**
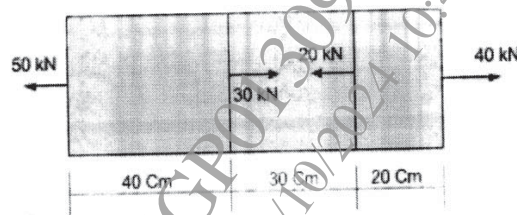

Figure 1

b) A brass rod 2m long is fixed at both its ends. If the thermal stress is not to exceed 76.5 MPa, calculate the temperature through which the rod should be heated. Take the value of alpha as 17×10^{-6}/K and E = 90 GPa. **[7]**

OR

Q2) a) A metal rod 20 mm diameter and 2 m long is subjected to a tensile force of 60 kN, it showed and elongation of 2 mm and reduction of diameter by 0.006 mm. Calculate the Poisson's ratio and three moduli of elasticity.**[8]**

b) A steel rod 500mm long and 20mm 10mm in cross-section is subjected to axial pull of 300 kN. If modulus of elasticity is 2×10^5 N/mm^2. Calculate the elongation of the rod. Also calculate strain induced in the bar. **[7]**

Q3) a) Draw Shear force and Bending moment diagram for the simply supported beam loaded and supported as shown in Figure 2. **[8]**
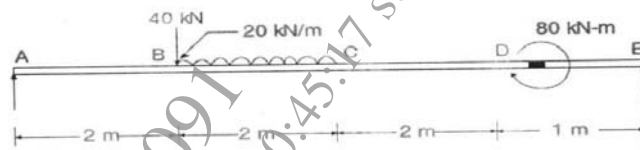

Figure 2

b) Draw Shear force and Bending moment diagram for the Cantilever beam loaded and supported as shown in Figure 3. **[7]**
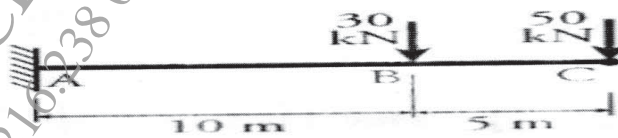

Figure 3

OR

Q4) a) Draw Shear force and Bending moment diagram for the simply supported beam loaded and supported as shown in Figure 4. **[8]**
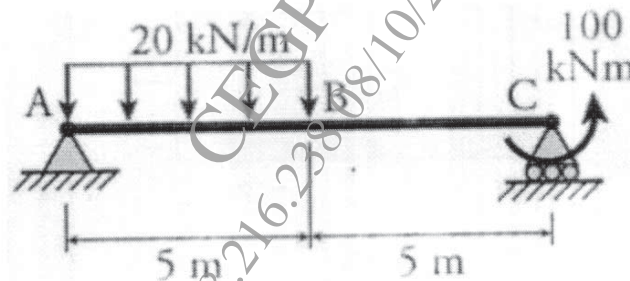

Figure 4

b) Draw Shear force and Bending moment diagram for the simply supported beam loaded and supported as shown in Figure 5. **[7]**
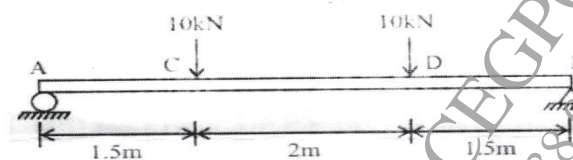

Figure 5

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