Total No. of Questions : 4]

SEAT No. : ____

PA-2

[Total No. of Pages : 2

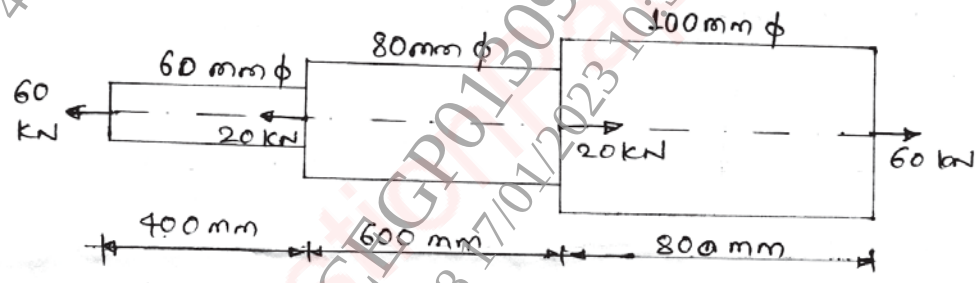
[5931]-2
S.E. (Civil)
MECHANICS OF STRUCTURES
(2019 Pattern) (Semester - I) (201002)

Time : 1 Hour] ***[Max. Marks : 30***

Instructions to the candidates:

1) ***Answer Q1 or Q2 and Q3 or Q4.***
2) ***Use of electronic calculator is allowed.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) A steel bar is subjected to forces as shown in the figure below. Determine total elongation of the bar. Take E = 210 GPa. **[8]**



b) A steel bar of 20 mm diameter and 1 m long is heated through 40°C with its ends clamped before heating. Calculate magnitude and nature of the stress developed in the bar. If the clamps do not yield. The coefficient of thermal expansion is $\alpha = 12 \times 10^{-5}$/°C and E = 210 GPa. **[7]**

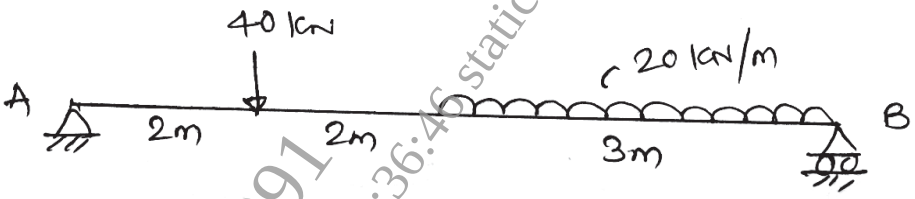
OR

Q2) a) A steel wire of length 500 mm is subjected to an axial pull of 25 kN. Find minimum diameter of the wire so that the stress does not exceet 190 MPa. Also determine the modulus of Elasticity of wire, do if elongation is 0.5 mm. **[7]**

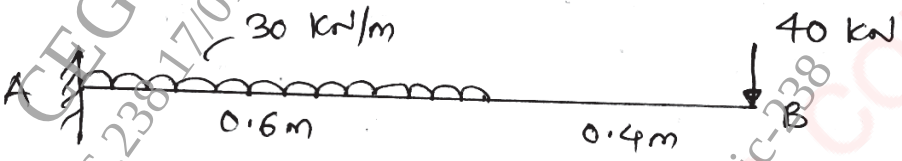
b) A RCC column 500 mm × 500 mm is reinforced with 4 bars of 25 mm diameter. Determine stresses induced in steel and concrete if the column is subjected to an axial load of 600 kN. Ratio of E_{steel} to $E_{concrete}$ is 13. **[8]**

P.T.O.

Q3) a) Draw Shear Force Diagram (SFD) and Bending Moment Diagram (BMD). **[8]**

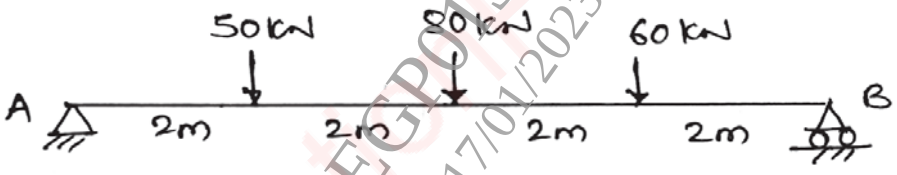


b) Draw SFD and BMD for the cantilever beam shown below. **[7]**



OR

Q4) a) Draw SFD and BMD of the simply supported beam. **[7]**



b) SFD of the beam is given below. Draw loading diagram and BMD. **[8]**