

Som Class 2 and Class 3

PRACTICE QUESTIONS

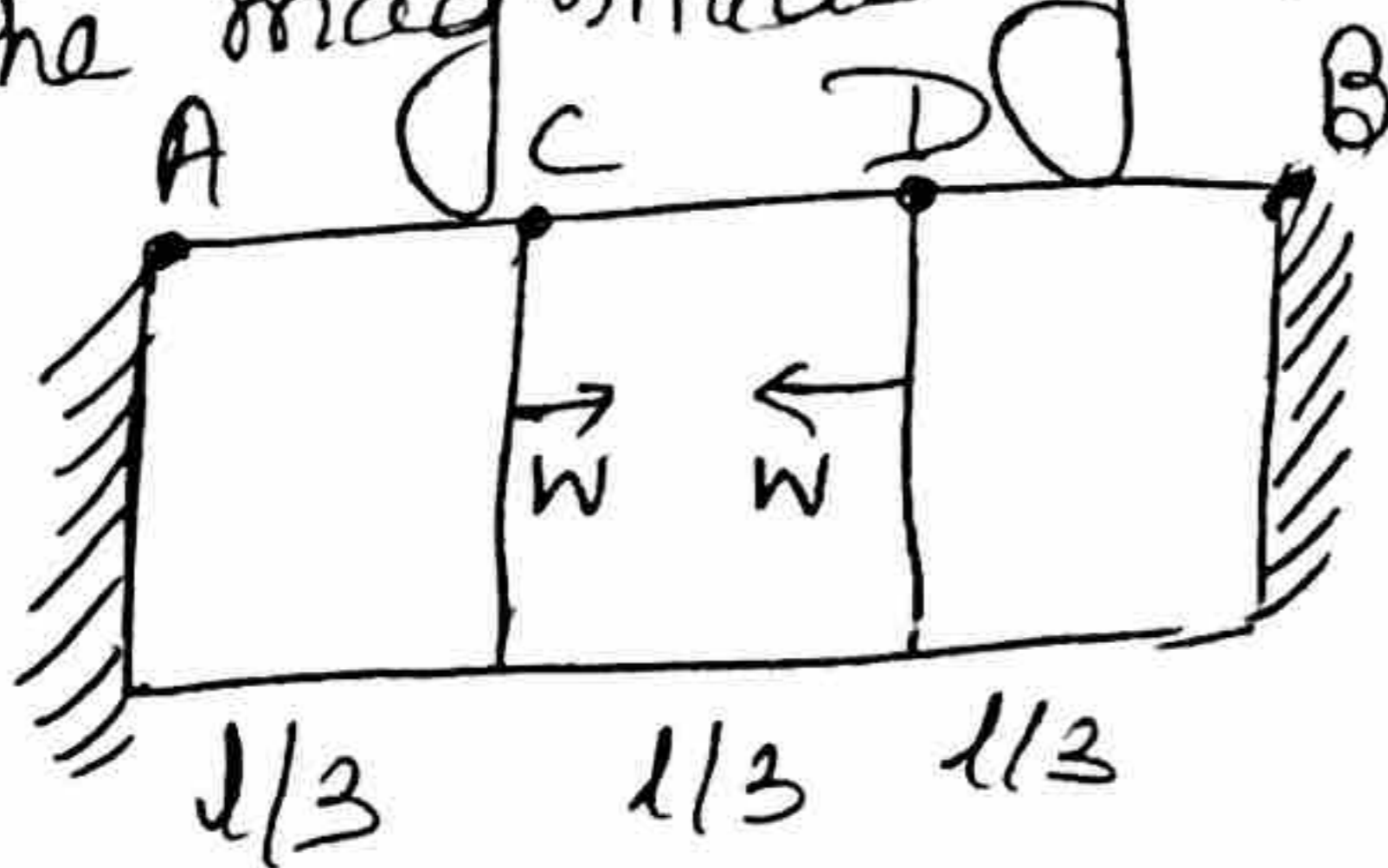
Q8 \Rightarrow If $G = 0.5 \times 10^5 \text{ N/mm}^2$, A 12 mm dia rod of material was subjected to a pull of 14 kN and change in dia was observed as $3.6 \times 10^{-3} \text{ mm}$. Calculate ν and E .

Q8 \Rightarrow If for an elastic element strain tensor is shown below
If the modulus of rigidity is 100 GPa, then Shear stress in x-y plane (τ_{xy}) is \Rightarrow

$$\text{STRAIN} = \begin{bmatrix} 0.003 & 0.004 & 0.000 \\ 0.004 & 0.006 & 0.000 \\ 0.000 & 0.000 & 0.003 \end{bmatrix}$$

- (a) 400 mPa (b) 500 mPa (c) 800 mPa (d) 1000 mPa.

Q8 A prismatic bar is loaded as shown in the figure, find the magnitude of reactions at the ends A & B.



For the above case also calculate the maximum axial force.

Q → A railway line is to be laid so that there is no stress in the rails at 8°C . Then calculate ⇒

- The stress in the rails @ 50°C when expansion is not allowed.
- Calculate the stress in rail if expansion allowed is 5mm @ 50°C .
- Calculate the expansion allowed in the rail, if the stress is to be zero when temp is 50°C .
- Calculate the maximum temp to have no stress in rails if the expansion is 12mm . length of rail is 30m , $\alpha = 12 \times 10^{-6}/^\circ\text{C}$, $E = 2 \times 10^5 \text{N/mm}^2$.

Q → A mild steel rod of 25mm dia and 400mm length is encased inside a hollow copper tube of external diameter 35mm and inside diameter 30mm . The ends of rod and tube are rigidly attached and the composite bar is subjected to an axial pull of 40kN .

$E_s = 200 \text{GN/m}^2$, $E_{cu} = 100 \text{GN/m}^2$. Then find the stress developed in the rod and the tube.

Q → Rod of variable section is shown in the figure. It is subjected to a pull of 100kN at the ends, then find the elongation.

