

STRENGTH OF MATERIALS
4th Exam/Mech./Auto/2093/Feb'2021
(For 2018 batch onwards)

Duration: 1.15Hrs.

M.Marks:25

SECTION-A

Q1. Attempt any three questions. Assume missing dimensions.

3x5=15

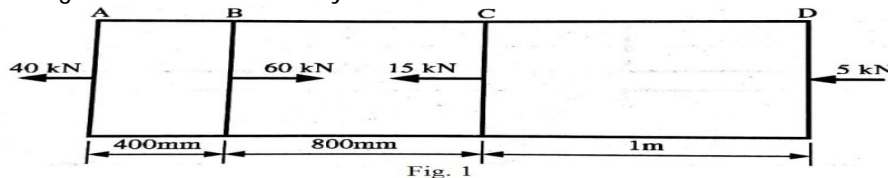
- Explain longitudinal and circumferential stresses in seamless thin walled cylindrical shells.
- Define Resilience, proof resilience and modulus of resilience.
- Define slenderness ratio and equivalent length of a column. Also write equivalent length for columns having both ends hinged, one end hinged and other end fixed.
- Define Hook's law, Elastic limit and limit of proportionality.
- Draw shear force diagram and bending moment diagram for a simply supported beam carrying uniformly distributed load on its span.
- An axial pull of 30kN is applied to a bar of length 2m and diameter 40mm. if modulus of elasticity of the material of the bar is $2 \times 10^5 \text{ N/mm}^2$, determine stress induced in the bar and total elongation of the bar.
- What is the difference between torque and torsion?

SECTION-B

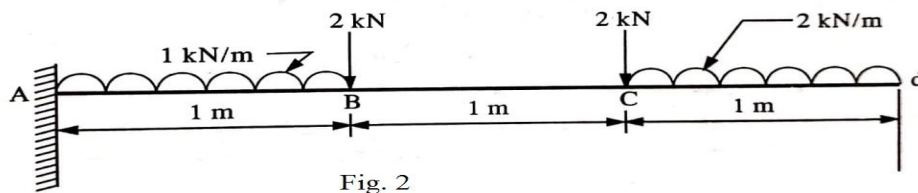
Q2. Attempt any one question.

1x10=10

- a. Fig.1 shows a brass bar of cross sectional area 800 mm^2 subjected to axial forces. Find total elongation of bar. Take Young's modulus of elasticity of the material of the bar = $1.05 \times 10^5 \text{ N/mm}^2$



- b. A cantilever beam, 3m long is loaded as shown in fig. 2, Draw the shear force and bending moment diagram for the cantilever.



- c. A solid steel shaft has to transmit 75kW at 200rpm. Taking allowable shear stress as 70 MN/m^2 . Find suitable diameter for the shaft, if the maximum torque transmitted on each revolution exceeds the mean by 30%.
- d. Find the moment of inertia of a L-section shown in fig. 3 about X-X and Y-Y axis passing through the centre of gravity of the section.

