

R07

Code: R7210304

B.Tech II Year I Semester (R07) Supplementary Examinations, May 2013

MECHANICS OF SOLIDS

(Mechanical Engineering)

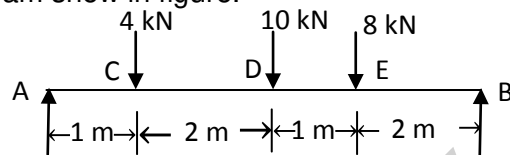
Time: 3 hours

Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Explain the stress-strain diagram for mild steel.
(b) Determine the changes in length, breadth and thickness of a steel bar which is 4 m long, 30 mm wide and 20 mm thick and is subjected to an axial pull of 30 kN in the direction of its length. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.3$.

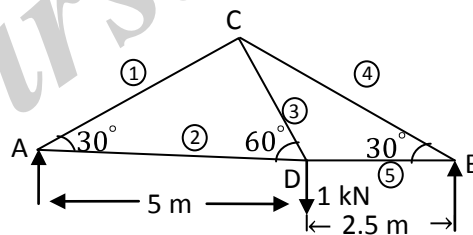
- 2 Draw the shear force and bending moment diagrams showing all the values for the simply supported beam show in figure.



- 3 Derive: $\frac{M}{I} = \frac{f}{y} = \frac{E}{R}$.

- 4 Show that for a rectangular section the maximum shear stress is 1.5 times the average stress.

- 5 A truss of span 7.5 m carries a point load of 1 kN at joint D as shown in figure. Find the reactions and forces in the members of the truss.



- 6 Derive the maximum deflection of a simply supported beam carrying a point load at the centre.

- 7 A closed cylindrical vessel made of steel plates 4 mm thick with plane ends, carries fluid under a pressure of 3 N/mm^2 . The diameter of cylinder is 25 cm and length is 75 cm, calculate the longitudinal and hoop stresses in the cylinder wall and determine the change in diameter, length and volume of the cylinder. Take $E = 2.1 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.286$.

- 8 Write short notes on:
(a) Thick cylinders subjected to outside pressures.
(b) Moment area method.
