

OR

- 4 a. Calculate the modulus of rigidity and bulk modulus of a cylindrical bar of diameter 25 mm and length 1.2 m. If the longitudinal strain in a bar during a tensile test is 4 times the lateral strain. Find the change in volume when the bar is subjected to a hydrostatic pressure of 120 N/mm^2 . Take $E = 1.2 \times 10^5 \text{ N/mm}^2$. (12 Marks)
- b. Explain briefly temperature effects on structure. (08 Marks)

Module-3

- 5 a. Write the assumptions made in Euler's column theory. (05 Marks)
- b. A simply supported beam of length 4 m is subjected to a UDL of 30 KN/m over the whole span and deflects 15 mm at the centre. Determine the crippling loads when this beam is used as a column with the following conditions.
- One end fixed and other end hinged
 - Both the ends are pinned.
- (15 Marks)

OR

- 6 Determine the Euler's crippling load for an I section of 5 m long as shown in Fig.Q6 which is used as a strut with both ends fixed. Take young's modulus for the section as $2.1 \times 10^5 \text{ N/mm}^2$.

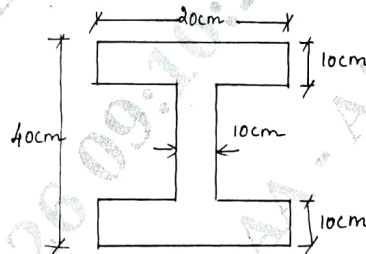


Fig.Q6

(20 Marks)

Module-4

- 7 a. Draw the SFD and BMD for a cantilever beam shown in Fig.Q7(a).

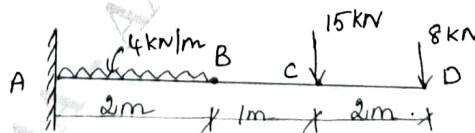


Fig.Q7(a)

(06 Marks)

- b. Draw the SFD and BMD for a simply supported beam shown below in Fig.Q7(b).

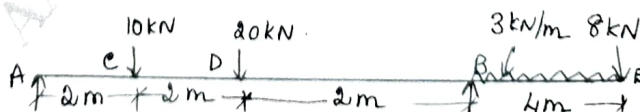


Fig.Q7(b)

(14 Marks)

OR

- 8 Draw SFD and BMD for a overhanging beam shown in Fig Q8.

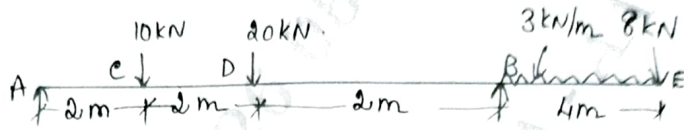


Fig.Q8

(20 Marks)

Module-5

- 9 a. Write the assumptions made in theory of pure bending and write the bending equation. (10 Marks)
- b. A 4 m long wooden beam has rectangular cross-section 200 mm \times 100 mm. The beam with simply supported ends is subjected to a point load 6 kN at its mid span. Calculate the maximum bending stress induced in the beam, when it is placed on the supports, such that : (10 Marks)
- i) $d = 200$ mm ii) $d = 100$ mm.

OR

- 10 An I section as shown in Fig.Q10 is subjected to a shearing force of 200 kN. Sketch the shear stress distribution across the section.

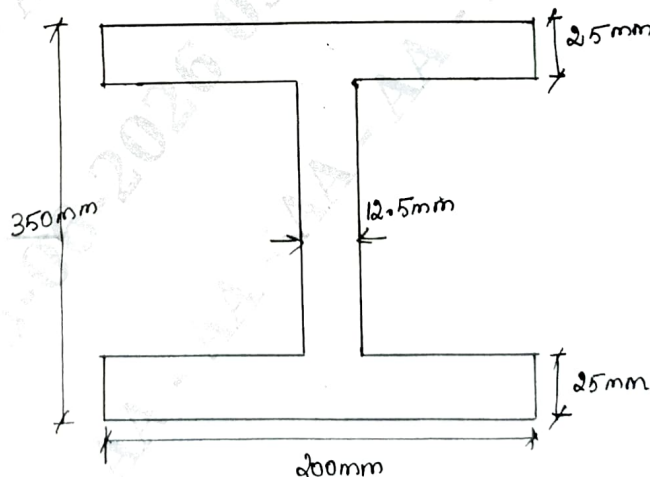


Fig.Q10

(20 Marks)
