



PART - B

(5×13=65 Marks)

11. a) i) From the observations of stress-strain curves of mild-steel, TOR steel, and concrete, what are all the distinguishing features can be observed? (3×2)
- ii) Starting from first principles, obtain the appropriate mathematical expressions for the closed-thin cylinder subjected to internal fluid pressure. (3+4)

(OR)

- b) A compound bar with loading is shown in Fig. 1 What is the relative position of point B with respect to point A? Take the Young's modulus of elasticity of the bar as 210 GPa. (13)

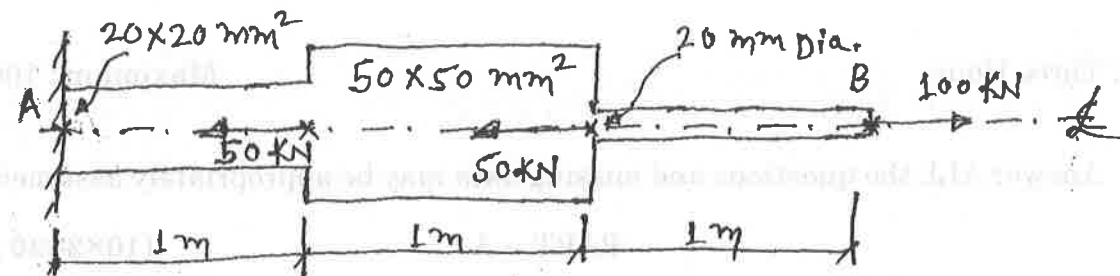


Fig. 1

12. a) Analyze the beam shown in Fig. 2 and draw the BMD indicating the salient points in it. (3+6+4)

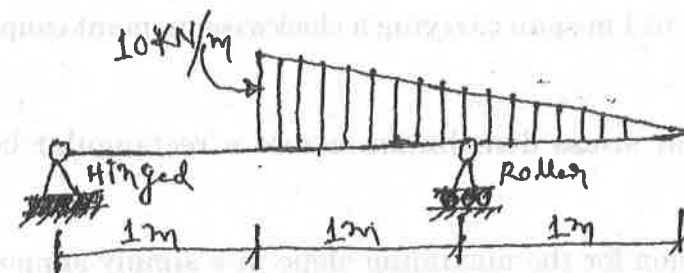


Fig. 2

(OR)

- b) A 160 mm wide and 200 mm deep timber beam is to be reinforced by bolting on two steel flitches each 160 mm × 10 mm in section. Find the moment of resistance when the :
- Flitches are attached symmetrically at the top and bottom, and
 - Flitches are attached symmetrically at the sides. Take the modular ratio of the materials as 20 and allowable stress in timber is 6 MPa. (6+7)



13. a) By area-moment method, find the deflection at the mid-span (P) of the prismatic and homogeneous beam shown in Fig. 3. (13)

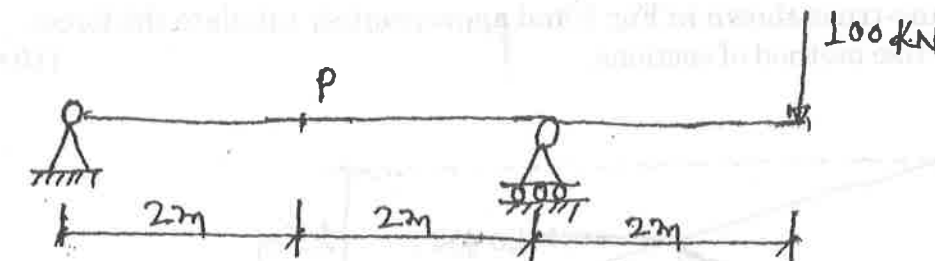


Fig. 3

(OR)

- b) By conjugate beam method, find the slope at the mid-span of the prismatic and homogeneous cantilever beam shown in Fig. 4. (13)

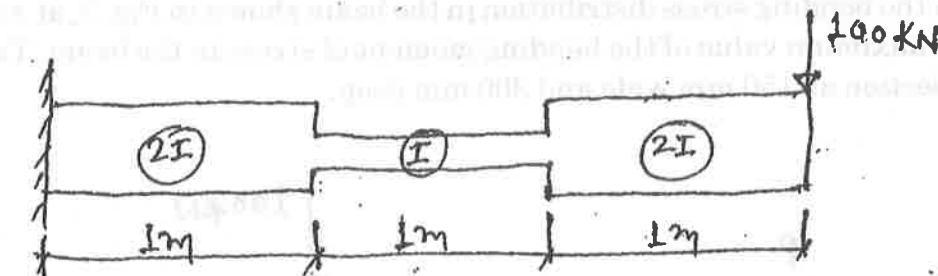


Fig. 4

14. a) A solid steel-shaft of 30 mm diameter is fixed at one end and free at the other end. If it is subjected to a clock wise torque of 100 kNm and carrying a load of 100 kN at the free-end, find the maximum shear stress developed in the shaft. (13)

(OR)

- b) Appropriately analyse the spring-systems, if they are in :
- series and
 - parallel. (6+7)