1331

Code : 15ME31T

Register Number | | | | | | | |

III Semester Diploma Examination, April/May-2018

STRENGTH OF MATERIALS

Time : 3 Hours] **[Max. Marks : 100**

Note : (i) Answer any **six** questions from Section – **A**.
(ii) Answer any **seven** full questions from Section – **B**.

SECTION – A

1. Define Poisson's ratio and Modulus of Elasticity. **5**

2. Explain Hoop's stress and longitudinal stress in thin cylindrical shells. **5**

3. State parallel and perpendicular axis theorem. **5**

4. Locate CG of triangle, rectangle, circle, semi-circle and trapezium with plain figure. **5**

5. Name the types of loads acting on beam with illustration. **5**

6. Explain point of contra-flexure in beams. **5**

7. State the assumptions made in theory of simple bending. **5**

8. Explain section modulus for solid, rectangular and circular sections. **5**

9. Write the Torsion equation with all notations. **5**

SECTION – B

10. A bar of 30 mm dia. is subjected to a pull of 60 kN. The measured extension is 0.09 mm and gauge length of 200 mm and change in diameter is 0.0039 mm. 10

Calculate :

(a) Poisson ratio

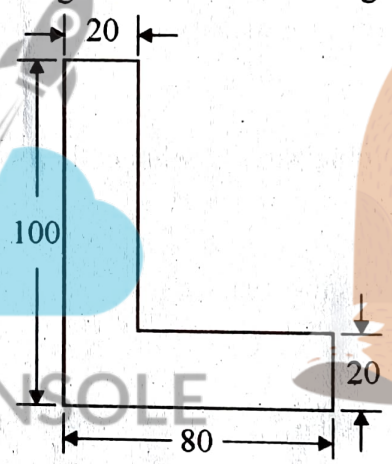
(b) Young's Modulus

(c) Bulk Modulus

(d) Rigidity Modulus

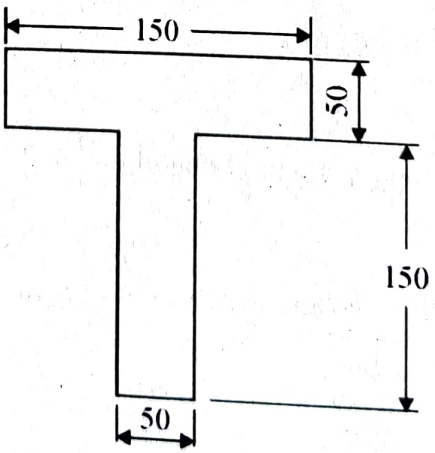
11. A steel bar 2 m long 40 mm wide and 20 mm thickness is subjected to axial pull of 160 kN in the direction of its length. Find the change in length, width and thickness of bar. Take E = 200 GPa and Poisson's ratio = 0.3. 10

12. Find the CG of an unequal angle section shown in fig. 10



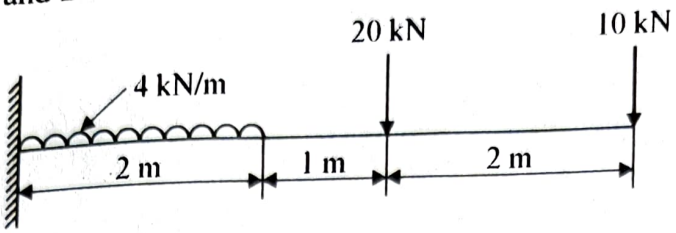
All dimensions are in mm .

13. Find the MI of T section shown in figure about XX and YY axis through the CG of the section. 10

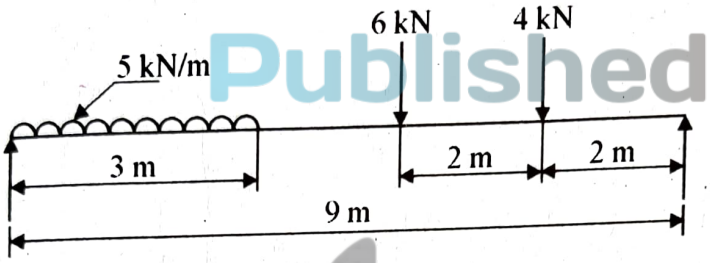


All dimensions are in mm

Draw the SFD and BMD for the cantilever beam shown in fig. 10



Draw the SFD and BMD for the simply supported beam shown in figure. 10



A rectangular beam 40 mm deep is simply supported over a span of 5 m long. What uniformly distributed load the beam may carry if the bending stress is not to exceed 120 MPa ? Take $I = 9 \times 10^6$ mm^4. 10

A circular pipe of external diameter 80 mm and thickness 10 mm is used as a simply supported beam over an effective span of 3 m. Find the maximum point load that can be applied at the centre of the span, if permissible stress of the tube is 150 N/mm^2. 10

(a) Explain proof resilience and modulus of resilience. 5

(b) Calculate the strain energy stored in the bar of 250 mm long, 40 mm wide and 20 mm thick when it is subjected to a tensile load of 50 kN.

Take $E = 2 \times 10^5$ N/mm^2. 5

A solid shaft of 120 mm diameter is required to transmit 200 kW at 100 r.p.m. If the angle of twist is not to exceed 2°, find the length of the shaft.

Take Modulus of Rigidity = 90 GPa. 10