Register No.:

713

April 2018

Time – Three hours
(Maximum Marks: 75)

[N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART – A and PART – B

(2) Answer division (a) or division (b) of each question in PART – C.

(3) Each question carries 2 marks in PART – A, 3 marks in Part – B and 10 marks in PART – C.]

PART – A

1. Define: (i)Elasticity and (ii)Ductility.
2. Define stress and strain.
3. State the static equilibrium equations.
4. Give the diagrammatic representation of fixed support along with the reactions.
5. Define centroid and centre of gravity.
6. Define moment of inertia.
7. What do you mean by perfect frame?
8. State Mohr's theorem II.

PART – B

9. Write the relationship between the elastic constants.
10. What is meant by statically determinate beam? Give an example.
11. Draw any three asymmetrical sections.
12. Define the term (i)Polar moment of inertia (ii)radius of gyration and (iii)Section modulus.
13. Define deflected shape and draw the deflected shape of simply supported and cantilever beam.
14. What do you mean by degree of indeterminacy? State the degree of indeterminacy of fixed beam.
15. Write Euler's and Rankine's formula for crippling load.
16. Define (i)Space diagram (ii)Bow's notation and (iii)Vector diagram.

[Turn over.....

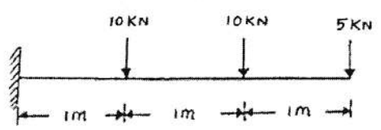
PART – C

17. (a) A circular rod of 200mm long and 10mm diameter was subjected to an axial pull of 5kN. The increase in length and reduction in diameter of the rod was found to be 0.06mm and 0.001mm respectively. Calculate the Poisson's ratio and the values of three elastic constants.

(Or)

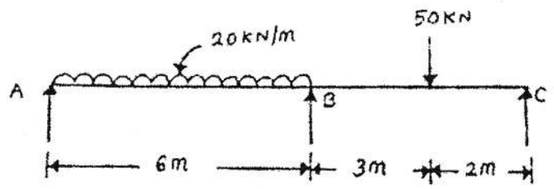
(b) A mild steel rod of 20mm diameter was tested for tensile strength with the gauge length of 60mm. Following were the observations. Final length = 78mm, Final diameter=12mm. Yield load = 34kN, ultimate load = 61kN. Calculate (i)Yield stress (ii)Ultimate stress (iii)Percentage of elongation and (iv) Percentage of reduction in area.

18. (a) Sketch the shear force and bending moment diagram for the beam as shown in figures.

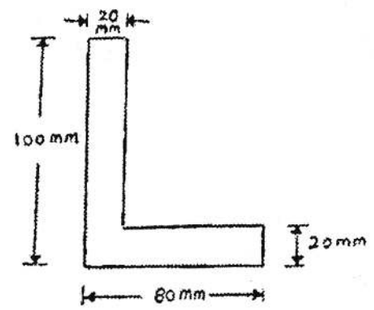


(Or)

(b) Draw the SFD and BMD for the beam as shown in figure.

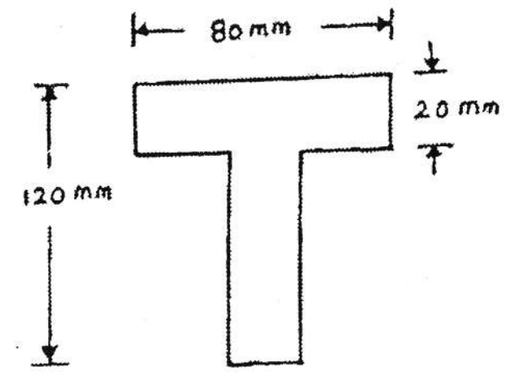


19. (a) Find the centroid of 'L' section as shown in figure.



(Or)

(b) Find the moment of inertia about XX and YY axes of given T section.



20. (a) A cantilever of 3m span carries an UDL of 25kN/m run spread over its entire length. In addition to this UDL, it also carries a point load of 40kN at the free end. Calculate the slope and deflection at the free end. Take E=2 X 10^5 N/mm^2 and I=8 X 10^7 mm^4.

(Or)

(b) A continuous beam ABC is simply supported at A and C such that AB=4m and BC=6m. The span AB carries a point load of 40kN at its mid span and the span BC carries an UDL of 15KN/m. Find the support moments by theorem of three moments. Draw the BMD.

21. (a) A steel tube 5m long, 35mm external diameter and 3mm thickness is used as a strut. Calculate the Euler's crippling load for the following end conditions: (i)When one end is hinged and other end is fixed. (ii)When both ends are fixed. (iii)When one end is fixed and the other end is free. Take E=2 X 10^5 N/mm^2.

(Or)

(b) Determine the magnitude and nature of forces in the members of the truss as shown in figure by graphical method.