803 Register No.:

October 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. Write the formula for elongation of a bar due to self weight.
2. Define beam.
3. What do you mean by asymmetrical section?
4. State parallel axis theorem.
5. State Mohr's theorem I.
6. Write the equation of theorem of three moments.
7. Define the term effective length.
8. Name any two types of truss.

PART – B

9. Define (i)Young's modulus (ii)Shear modulus and (iii)Bulk modulus.
10. Draw the stress and strain behaviour of a ductile material under tension and mark the salient points.
11. Sketch the different types of supports along with the reactions.
12. Briefly explain the classification of frame.
13. Compare symmetric and anti-symmetric sections.
14. Define (i)Moment of inertia (ii)Section modulus and (iii)Polar modulus.
15. Define the terms (i)Slope and (ii)Deflection.
16. Draw SFD and BMD of a cantilever beam of length 'l' m carrying a point load of 'P' kN at its free end.

[Turn over.....

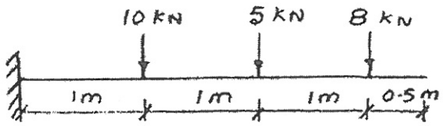
PART – C

17. (a) A circular rod of 10mm and length 200mm elongates 0.50mm under an axial pull of 50kN. If the change in diameter is 0.001mm, calculate the value of elastic constants.

(Or)

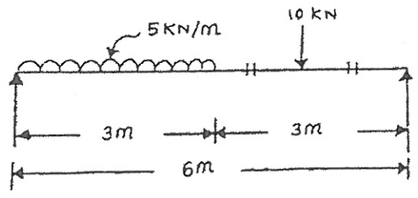
(b) A bar of steel is 500mm long. Two ends are 32mm and 28mm in diameter and each is 125mm long. The middle portion is 25mm diameter. The axial pull on the bar is 100kN and $E=2\times10^5$ N/mm^2. Find the total elongation of the bar, also determine the minimum and maximum stresses produced in the bar.

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

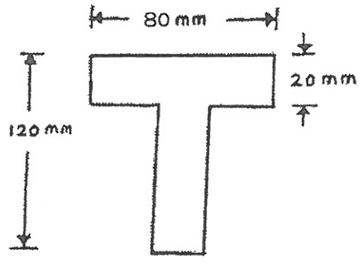


(Or)

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

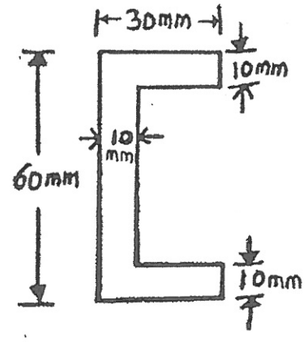


19. (a) Find the centroid of 'T' section as shown in figure.



(Or)

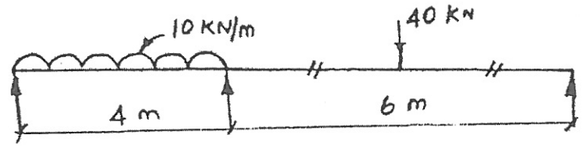
(b) Find the moment of inertia about XX and YY axes of given 'C' section.



20. (a) A cantilever of 4m span carries a uniformly distributed load of 10 kN/m over its entire length. The cross section of beam is 200mm × 300mm. Young's modulus is $E=2.1\times10^5$ N/mm^2. Calculate the maximum slope and deflection at the free end of the beam.

(Or)

(b) Draw the BMD of the continuous beam as shown in figure by theorem of three moments.



21. (a) Compare the buckling loads by Euler's and Rankine's methods of a tubular steel strut of 2.5m effective length, having outer and inner dimensions of 50mm and 40mm respectively. The yield stress $\sigma_c = 340$ N/mm^2, $E=2\times10^5$ N/mm^2 and Rankine's constant =1/7000.

(Or)

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