

ROLL No:

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Total number of pages:[2]

Total number of questions:06

B.Tech. || CE || 3rd Sem
Strength of Material
Subject Code:BTCE-301A

Paper ID:

Time allowed: 3 Hrs

Max Marks: 60

Important Instructions:

- All questions are compulsory
- Assume any missing data

PART A (2×10)

Q. 1. Short-Answer Questions:

- (a) What is Factor of Safety? Write its Practical importance.
- (b) Define Normal stress and Tangential stress?
- (c) What is Point of Contra-flexure?
- (d) Write down Flexural Formula for beams.
- (e) What is difference between Column and Beam?
- (f) Define Torsional Flexibility and Torsional Rigidity.
- (g) What are the various types of Supports?
- (h) What is Second Moment of Area?
- (i) State Parallel axis Theorem of M.O.I.
- (j) List the various theories of elastic failure.

PART B (8×5)

Q. 2 What do you understand by Stress and Strain? Draw Stress-Strain diagram for the Ductile and Brittle material and explain all the stages in detail. CO1

OR

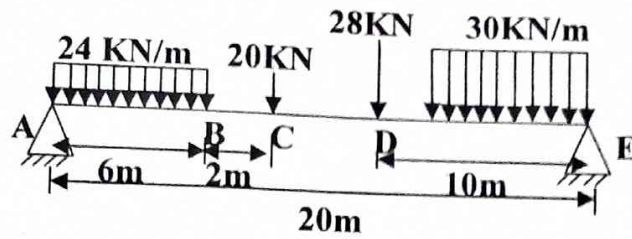
A cylindrical thin drum 800 mm in diameter and 3 m long has a shell thickness of 10 mm. If drum is subjected to internal pressure 4.5 N/mm^2 . Determine (i) Change in diameter (ii) Change in length (iii) Change in volume. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and Poisson's ratio = 0.29. CO1

Q. 3. What are principle planes and principal stresses? Determine the values of normal, tangential and resultant stresses when a member is subjected to unequal and like normal stresses in two mutually perpendicular directions. CO2

OR

At a certain point in a strained material, the principal tensile stresses across two perpendicular planes are 150 N/mm^2 and 80 N/mm^2 . Determine normal stress, shear and resultant stresses on plane inclined at 35° with the major principal plane. Also determine the Obliquity. What will be intensity of stress which acting alone will produce the same max. strain if Poisson's ratio = 0.25. CO2

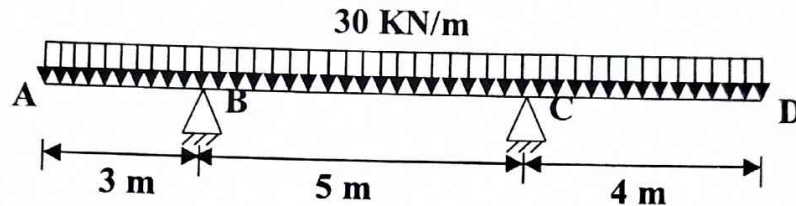
Q. 4. Draw S.F.D and B.M.D for the given Simply Supported Beam CO3



OR

Draw S.F.D and B.M.D for the given beam

CO3

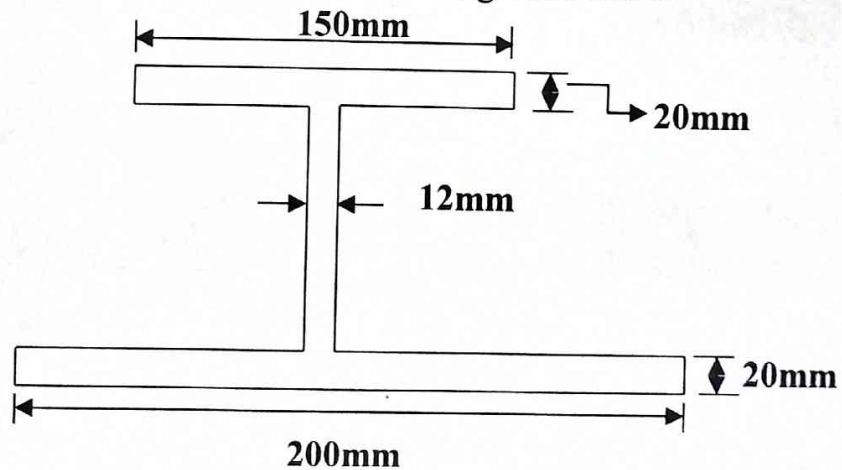


- Q. 5. An aluminum strip of rectangular cross section 100 mm wide and 150 mm deep. Determine the maximum tensile and compressive stresses when simply supported beam is subjected to u.d.l of 3 kN/m and length of span is 4 m. the beam resists bending moment about N.A. CO4

OR

Find M.O.I about centroidal axis XX and YY of the given section

CO4



- Q. 6. A column 4 m long is 90 mm in diameter. Find the safe compressive loads for the member using Euler's formula when (i) One end of column is fixed while another end is hinged (ii) Both ends of column are fixed. If factor of safety is 3.5. Take $E = 2 \times 10^5 \text{ N/mm}^2$. CO5

OR

What is pure torsion? What are the assumptions in the theory of pure torsion. Drive the pure torsion equation. CO6