Code No. 47

FACULTY OF ENGINEERING

B.E. 2/4 (M/P/AE) I - Semester (Main) Examination, December 2017

Subject : Mechanics of Materials

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Define Hardness and Stiffness (2)

2 Write elements of Mohr's circle of stresses (2)

3 Write the relation between shear force, BM and intensity of loading (2)

4 Write small notes on flexural rigidity (2)

5 Explain slope and deflection (2)

6 Difference between closely coiled and open coiled helical spring. (3)

7 Write the relation between longitudinal shear stress and lateral shear stress. (3)

8 Write down importance of compound cylinders. (3)

9 Explain Kern of the section (3)

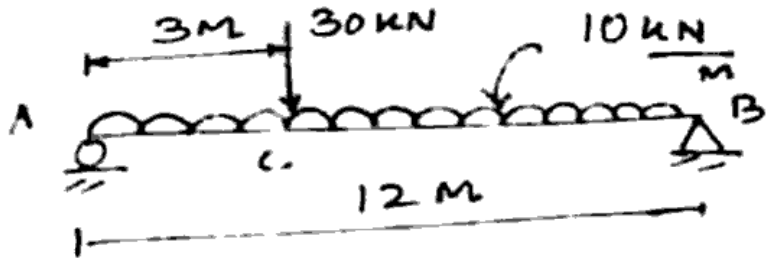
10 Find sectional modulus of a circular section of dia 400 mm. (3)

PART – B (50 Marks)

11 Derive pure torsion equation

$$\frac{T}{J} = \frac{C}{r} = \frac{C\theta}{l}$$

12 Draw SFD and BMD

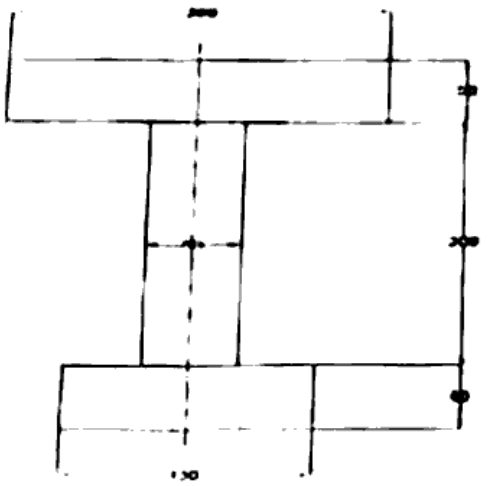


13 A simply supported beam of span 16M carries a point of 10kN at a distance of 4M form left support. Find max deflection of the beam in terms of EI by using fundamentals of Macaulay's method.

14 A T-section beam with 100 mm x 10 mm flange and 150mm x 15 mm web is simply supported and subjected to a UDL of 10 kN/M over its entire span 8M. Draw the variation of shear stress across the depth of the beam at the supports and obtained man shear stress at the section.

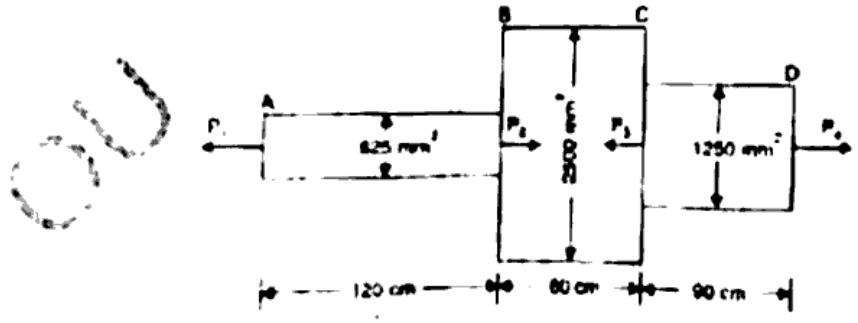
..2

15



16 A compound cylinder is made by shrinking a cylinder of external diameter 300mm and internal diameter of 250mm over another cylinder of external diameter 250mm and internal diameter 200mm. The radial pressure at the junction after shrinking is 8 N/mm^2 find the final stresses set up across the section, when the compound cylinder is subjected to an internal fluid pressure of 84.5 N/mm^2 10

17 A member ABCD is subjected to point loads P_1, P_2, P_3 and P_4 as shown in below figureCalculate the force P_2 necessary for equilibrium, if P_1 = 45KN, P_3 = 450KN and P_4 = 130KN Determine the total elongation of the member. Take E= 2.1 X 10^5 N/mm^2 10



18 A point in a strained material is subjected to stresses as shown in below figure. Using Mohr's circle method, determine the normal, tangential and resultant stresses across the oblique plane 10