

3. The bar shown in figure 1 is tested in universal testing machine. It is observed that at a load of 40 kN the total extension of the bar is 0.285 mm. Determine the Young's modulus of the material  $P = 40$  kN. 15

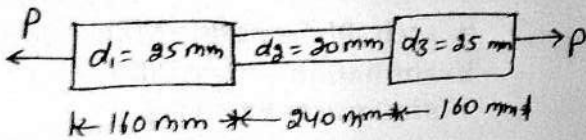


Figure 1

UNIT - II

4. The simply supported beam has been shown in fig 2. Draw the SFD and the BMD (shear force and bending moment diagrams). 15

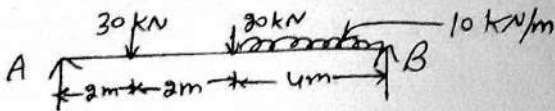


Figure 2

5. Derive the equation of bending stress also state the assumptions in simple theory of bending. 15

UNIT - III

6. Calculate the maximum intensity of shear stress induced and the angle of twist produced in degrees in solid shaft of 100 mm diameter, 10m long transmitting 112.5 kW at 150 rpm. Take  $G = 82$  KN/mm<sup>2</sup>. 15

7. A simply supported beam as shown in figure 3. Calculate (i) the position and the value of max. deflection (ii) Deflection at load point 18 kN. 15

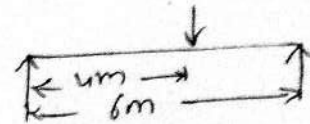


Figure 3

UNIT - IV

8. Explain the following : 15  
 (a) Maxwell reciprocating theorem  
 (b) Columns & struts
9. Explain the following : 15  
 (a) Derivation of Euler's formula  
 (b) Effective/Equivalent length

Roll No. ....

**3114**

**B. Tech. 4th Semester (ME)**

**Examination – May, 2023**

**STRENGTH OF MATERIALS**

**Paper : PCC-ME-206-G**

*Time : Three hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. **1** is *compulsory*. All questions carry equal marks.

1. (a) Define volumetric strain.
- (b) Write bending stress equation with its notations.
- (c) Define slenderness ratio.
- (d) Define polar moment of inertia.
- (e) Define section modulus.
- (f) Define Hook's law. 2.5 × 6 = 15

**UNIT – I**

2. Derive the relationship between various elastic constants in details.

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P. T. O.