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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

SUMMER TERM/MAKE UP END TERM EXAMINATION

Semester: Summer Term 2019

Date: 26 July 2019

Course Code: MEC 206 / ME A 203

Time: 2 Hours

Course Name: Mechanics of Solids

Max Marks: 80

Program & Sem: B.Tech & III Sem (2015/2016/2017 Batch)

Weightage: 40%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted

Part A

Answer **all** the Questions. **Each** question carries **eight** marks. (3Qx8M=24)

1. What do you understand by principal planes and T_{max} planes? Explain.
2. With neat sketch explain the different regions in stress-strain diagram for ductile material.
3. A solid shaft of 80 mm diameter is used to transmit torque. Find the maximum torque transmitted by the shaft if the maximum shear stress permitted in the shaft is 80 N/mm^2 .

Part B

Answer **both** the Questions. **Each** question carries **thirteen** marks. (2Qx13M=26)

4. A bar of diameter d and length L is fixed at one end and subjected to a torque T at free end. Draw a neat sketch showing angle of twist & shear angle. Also prove that

$$\frac{T}{J} = \frac{G\theta}{L} = \frac{\tau_{max}}{R}$$

5. Derive the expression $\frac{M}{I} = \frac{\sigma_b}{y} = \frac{E}{R}$ for a beam, when it is subjected to pure bending.

Part C

Answer **both** the Questions. **Each** question carries **fifteen** marks. (2Qx15M=30)

6. Answer the following questions for the beam shown in Fig 1 below.

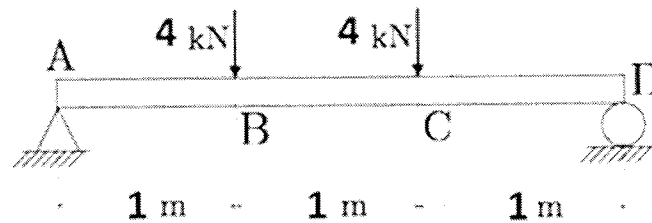


Fig. 1: A Beam Acted on by two Point Loads

- (i) Determine all the reactions at the supports A and D.
 - (ii) Plot the Shear Force Diagram.
 - (iii) Plot the Bending Moment Diagram.
7. A point is subjected to biaxial state of stress as shown in figure 2.

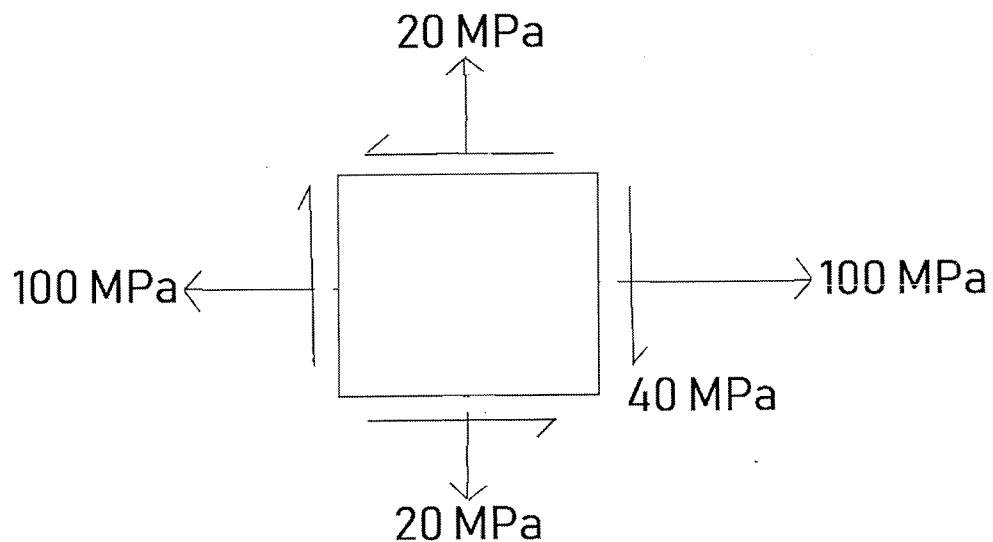


Fig 2.

Draw the Mohr's circle and determine the principal stresses and the maximum shear stress graphically.