

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

B.Tech-IV Semester (Civil)

COURSE CODE: 18B11CE415

MAX. MARKS: 15

COURSE NAME: Mechanics of Solids

COURSE CREDITS: 03

MAX. TIME: 1 Hour

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Marks are indicated against each question in square brackets.

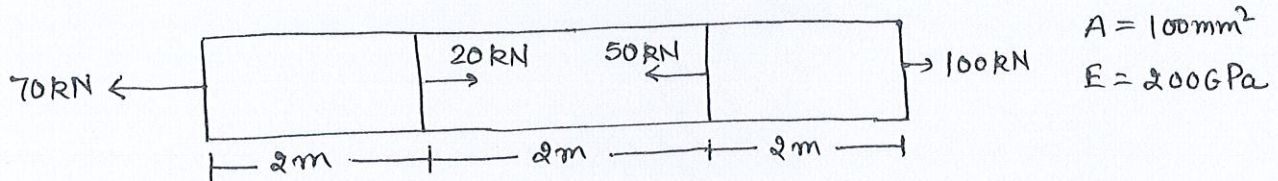
Q1. Draw stress strain diagram of mild steel representing different zones under deformation. [2]

Q2. Draw the stress strain diagram for following materials

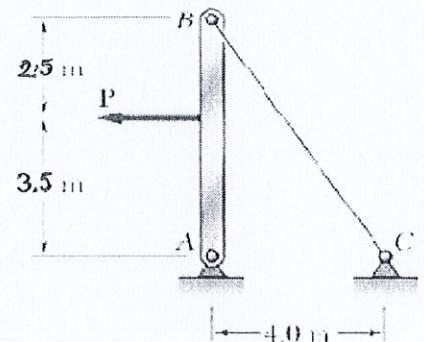
(a) Ideal Fluid (b) Ideal Plastic (c) Elastoplastic (d) Viscoelastic [2]

Q3. "Rubber is a brittle material", explain the statement with proper reasons. [1]

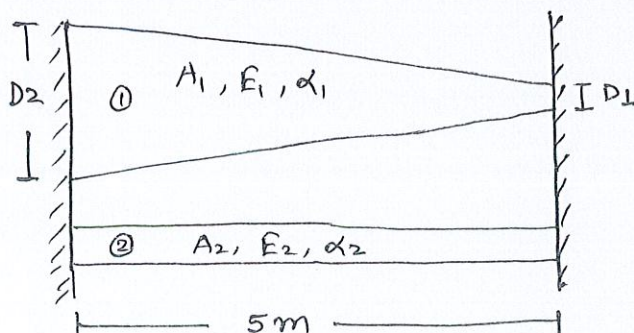
Q4. For the given prismatic bar, find the total elongation in the bar. [3]



Q5. Cable BC of diameter 4 mm is made of steel having $E = 200 \text{ GPa}$. Knowing that the maximum stress in the cable must not exceed 190 MPa and the elongation of the cable must not exceed 6 mm ; find the maximum load P that can be applied. [4]



Q6. For the given combination of bars, if the temperature of the system is increased by 60°C , find the forces generated at the support. [3]



$$\begin{aligned}
 D_1 &= 10 \text{ mm} \\
 D_2 &= 20 \text{ mm} \\
 E_1 &= 2 \times 10^6 \text{ MPa} \\
 E_2 &= 10^6 \text{ MPa} \\
 \alpha_1 &= 1.2 \times 10^{-6} / ^\circ\text{C} \\
 \alpha_2 &= 1.5 \times 10^{-6} / ^\circ\text{C} \\
 A_2 &= 100 \text{ mm}^2
 \end{aligned}$$