

MECHANICAL PROPERTIES OF SOLIDS

General Instructions: Answer all the questions. If you are unable to answer any question, go through the page number that is given against that particular question in the text book. You can find the answer.

Test Paper-I

MAX MARKS: 30

TIME: 90Mts

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| 1 | What is a rigid body? | P231 | 1 |
| 2 | What is meant by elasticity? Give an example | P231 | 1 |
| 3 | What is Plasticity? Give an example. | P231 | 1 |
| 4 | Define stress. Give the formula to find stress. Also give the SI unit of measurement of it. | P232 | 2 |
| 5 | What is longitudinal strain? Give the formula to find the longitudinal strain? | P232 | 2 |
| 6 | Give the differences between longitudinal stress and shearing stress. | P232 | 2 |
| 7 | Define volume strain. What is the SI unit of measurement of it? | P232 | 2 |
| 8 | State Hooke's Law. Also plot the stress –strain curve for a metal showing the different regions | P234 | 3 |
| | (i) elastic limit | | |
| | (ii) Permanent set | | |
| | (iii) Yield point | | |
| | (iv) Permanent set | | |
| 9 | Plot the stress-strain curve for the elastic tissue of Aorta. What do you call such a substance? | P235 | 3 |
| 10 | Define Young's Modulus of elasticity. What is the unit of measurement of Modulus of elasticity? Derive the formula to find the Young's Modulus of elasticity. | P235 | 3 |
| 11 | A structural steel rod has a radius of 10 mm and a length of 1.0m. A 100kN force stretches along its length. Calculate (a) stress, (b) elongation, and (c) strain on the rod. Young's modulus of structural steel is $2.0 \times 10^{11} \text{ N m}^{-2}$. | P236 | 3 |
| 12 | A copper wire of length 2.2 m and a steel wire of length 1.6m, both of diameter 3.0mm, are connected end to end. When stretched by a load, the net elongation is found to be 0.7.mm. Obtain the load applied. | P236 | 3 |
| 13 | Explain how will you determine the Young's Modulus of the Material of a wire | P237 | 3 |
| 14 | What is hydraulic stress? | P234 | 1 |