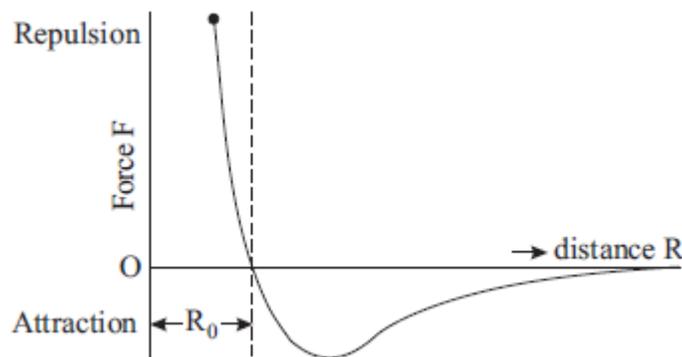


National Institute of Open Schooling
Senior Secondary Course: Physics
Lesson 8: Elastic Properties of Solids
Worksheet-8

1. It is well known phenomenon that some objects regain their original shape and size when a suitable force is applied on these objects whereas others do not. Explain why it is so with suitable examples from your surroundings.

2. Frame any two questions for the following Paragraph –

We know that matter is made up of atoms and molecules. The forces which act between them are responsible for the structure of matter. The interaction forces between molecules are known as inter-molecular forces.



The variation of inter molecular forces with inter molecular separation is shown in above figure.

When the separation is large, the force between two molecules is attractive and weak. As the separation decreases, the net force of attraction increases up to a particular value and beyond this, the force becomes repulsive. At a distance $R = R_0$ the net force between the molecules is zero. This separation is called equilibrium separation. Thus, if inter-molecular separation $R > R_0$ there will be an attractive force between molecules. When $R < R_0$, a repulsive force will act between them.

3. Continue to Q2, classify the objects from your surroundings into solid, liquid, and gaseous. The forces which act between molecules are responsible for the structure of matter. Define and explain the forces responsible for the structure of matter.
4. Observe your surroundings and enlist Elastic and Plastic Bodies. Define Elastic and Plastic Bodies. Is any perfectly elastic or perfectly plastic body exists in nature? Explain the phenomenon of elasticity in terms of inter-molecular forces.

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5. When an external force or system of forces is applied on a body, it undergoes a change in the shape or size according to nature of the forces. But the internal restoring force opposes the deforming force. Define and explain the internal restoring force acting per unit area of cross-section of a deformed body and its different types with suitable examples.

6. Take a metallic wire of uniform cross-section. Apply different amount of increasing forces and note down the changes in metallic wire. Plot a Stress-Strain Curve for metallic wire when a metallic wire of uniform cross-section is subjected to different amount of increasing forces. Explain the regions and points on the curve that is of particular importance.

7. Explain and verify Hooke's Law.

8. A tensile test was conducted on a steel wire. The diameter and the gauge length of wire were 5cm and 200cm respectively. Wire was stretched by a load 5kg. The extension in wire was 0.21mm. Calculate
 - a) Longitudinal Stress
 - b) Longitudinal Strain
 - c) Young's Modulus

9. A metal rod of 40 mm diameter and 4 m long is subjected to a tensile force of 120 kN, it showed an elongation of 4 mm and reduction of diameter by 0.012 mm. Calculate the Poisson's ratio and three moduli of elasticity.

10. Observe your surroundings and write different applications of elastic behaviour of materials in day to day life.