

CLASS 11

PHYSICS

EXTRA QUESTIONS

Class 11 Physics Chapter 8 Mechanical Properties of Solids – Extra Questions with Answers

Extra practice questions for Class 11 Physics Chapter 8 (Mechanical Properties of Solids), beyond the textbook. These Class 11 Physics Chapter 8 important questions are handy for last-minute exam practice.

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Very Short Answer Questions (1 mark)

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Class 11 Physics Chapter 8 – Solutions and Notes

Extra practice questions for Class 11 Physics Chapter 8 (Mechanical Properties of Solids), beyond the textbook. These Class 11 Physics Chapter 8 important questions are handy for last-minute exam practice.

Very Short Answer Questions (1 mark)

Q1. What is the SI unit of stress?

Ans: N/m^2 (pascal, Pa).

Q2. Is strain a dimensionless quantity?

Ans: Yes, strain has no units since it is a ratio of two lengths (or volumes).

Q3. Write the formula for Young's modulus.

Ans: $Y = (F/A)/(\Delta L/L) = FL/(A\Delta L)$.

Q4. What happens to a wire beyond its elastic limit?

Ans: It undergoes permanent (plastic) deformation and does not return to its original shape when the load is removed.

Q5. Define Poisson's ratio.

Ans: The ratio of lateral strain to longitudinal strain produced in a stretched wire or rod.

Short Answer Questions (2–3 marks)

Q6. A wire of length 2 m and cross-sectional area $1 \times 10^{-6} \text{ m}^2$ stretches by 1 mm under a force of 100 N. Find the stress and strain.

Ans: $\text{Stress} = F/A = 100/(1 \times 10^{-6}) = 10^8 \text{ N/m}^2$. $\text{Strain} = \Delta L/L = 0.001/2 = 5 \times 10^{-4}$.

Q7. Using the values from Q6, calculate Young's modulus of the wire's material.

Ans: $Y = \text{Stress}/\text{Strain} = 10^8/(5 \times 10^{-4}) = 2 \times 10^{11} \text{ N/m}^2$.

Q8. A solid sphere of volume 1 m^3 experiences a pressure increase of $2 \times 10^5 \text{ Pa}$, reducing its volume by 0.001 m^3 . Find the bulk modulus.

Ans: $K = -\Delta P/(\Delta V/V) = 2 \times 10^5/(0.001/1) = 2 \times 10^8 \text{ Pa}$.

Higher-Order Thinking / Application Questions

Q9. Two wires of the same material have lengths in ratio 2:1 and diameters in ratio 1:2. If the same force is applied to both, find the ratio of their elongations, explaining the role of Young's modulus.

Ans: Since $\Delta L = FL/(AY)$, and Y is the same material property for both wires, $\Delta L \propto L/A \propto L/d^2$. Ratio of elongations $= (L_1/d_1^2)/(L_2/d_2^2) = (2/1^2)/(1/2^2) = (2/1)/(1/4) = 8$. So the elongation of the first wire is 8 times that of the second, because a longer, thinner wire stretches more for the same force under a fixed Young's modulus.

Q10. Explain, using the stress-strain graph, why a material like rubber can be stretched a lot without breaking but does not obey Hooke's law over most of that range, while a material like steel obeys Hooke's law over a much larger stress range but breaks at relatively small strain.

Ans: Steel has a stress-strain graph that is linear (obeying Hooke's law, $\text{stress} \propto \text{strain}$) over a wide range of stress before reaching its elastic limit and eventual fracture point, but the maximum strain it can sustain before breaking is small, meaning it is stiff but not very stretchable. Rubber, by contrast, has a stress-strain curve that is markedly non-linear (curved) almost from the start, meaning stress is not proportional to strain.

except at very small deformations — so it does not obey Hooke's law through most of its stretching range. However, rubber can undergo very large strains (elongate significantly) before reaching its breaking point, due to the coiled polymer chain structure of its molecules being able to uncoil and stretch substantially while still returning to its original shape when the force is removed (within its elastic limit).

Class 11 Physics Chapter 8 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the [Class 11 Physics Chapter 8 Solutions](#) and [Class 11 Physics Chapter 8 Revision Notes](#).

See also: [Chapter 1](#) | [Chapter 2](#) | [Chapter 3](#) | [Chapter 4](#) | [Chapter 5](#) | [Chapter 6](#) | [Chapter 7](#) | [Chapter 8](#)

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