PHYSICS

BOOKS - R G PUBLICATION

MECHANICAL PROPERTIES OF SOLIDS

Exercise

1. Among solids, liquids and gases, which one can have all the moduli of elasticity?

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2. What is the unit of spring constant?

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3. what is poisson's ratio ?

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4. what is poisson's ratio ?

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5. Define young's modulus and describe a method of measuring its value .

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6. Calculate the value of stress in a wire of steel having radius of 2mm, when 10kN of force is applied on it.

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7. A steel has a radius of 10mm and a length of 1.0m. A 100kN force stretches it along its length. Calculate stress and strain on the rod. Young's modulus of steel is $2.0 \times 10^{11} Nm^{-2}$.

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8. What is stress and strains?

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9. Write the Hooks' law.

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10. Write the dimension of strain.

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11. what is poisson's ratio ?

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12. Write the relation among the modulus of elasticities.

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13. What is Rigidily modulus of elasticity.

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14. What do you mean by Young's modules of elasticity?

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15. What is elastic limit.?

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16. What is Bulk modules of elasticity?

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17. What is shearing strain?

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18. State hooke's law and define the various moduliii of elasticity .

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19. With the help of graph explain the elastic limit of a material.

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20. Calculate the amount of work done for a wire which area of cross section $10^{-6}m^2$ and length 1.5m to increase the length 4×10^{-3} m. Young's modules of elasticity $2 \times 10^{11N/m^2}$.

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21. Two wire having same length and same radius and given same load. One made of steel and other copper. If Young's modules of elasticity is twice that of other then calculate

the potential energy stored in copper and steel.

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22. Two wire made of same material and ratio of their length is 1:2 and ratio of raidus is 2:1. If they are strecthed by same force calculate the ratio of increase in length.

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23. Explain which is more elastic glass and rubber.

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24. 2m/copper wire of length applying force length increase by 1mm. If the energy of the wire is converted to heat energy, calculate the increasing $temp^n$ of the wire.(Y= 12.5 × 10^10 N/m^2; ρ = 9 × 10^3 kg /m^3 ; s = 385 J/kg – K)

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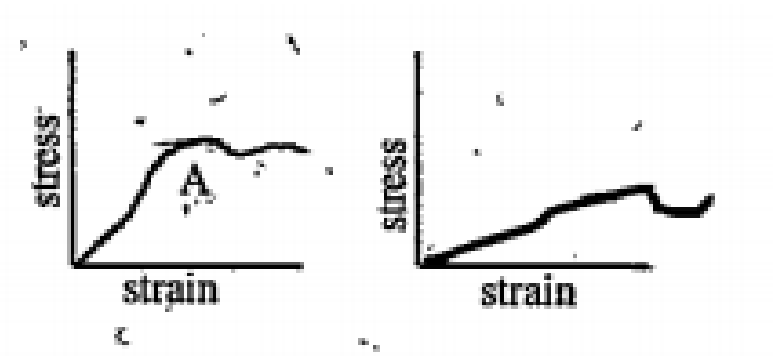
25. The stress strain group for material A & B are shown in figure



Which of the material has greater Young's modules?

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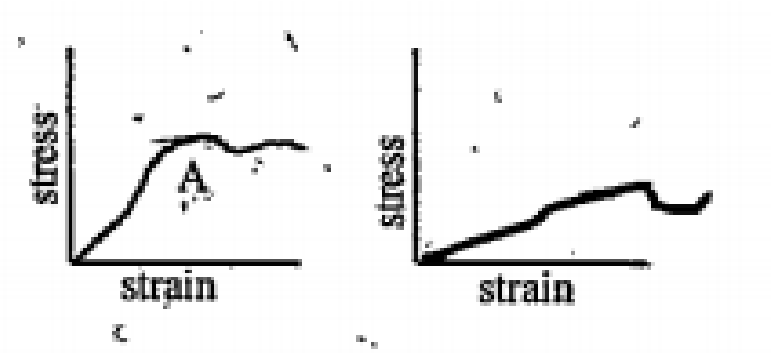
26. The stress strain group for material A & B are shown in figure



Which is stronger material?

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27. A steel wire of diammeter 2 mm is pulled to increase its length by 1% what is the restoring

force developed in it if young's modulus for steel $2 \cdot 10^{12}$ dynes/ cm ^2 .

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28. Show that energy density $= \frac{1}{2} \times stress \times stra \in .$

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29. Explain how Young's modules of elasticity changes with temperature.

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