INDIAN SCHOOL DARSAIT
DEPARTMENT OF PHYSICS

Subject : Physics	**Chapter** : Mechanical Properties of Solids	**Worksheet No**. 9
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Name of the Student :_____	**Class & Division** : XI A/B	**Roll Number** : ___

1. Steel is more elastic than rubber. Explain. 1

2. What is the value of bulk modulus of an incompressible liquid. 1

3. A wire is stretched by a force such that its length becomes double. How will the Young's modulus of the wire be affected? 1

4. The ratio of radii of two wires of the same material is 2:1. If these wires are stretched by equal forces, find the ratio of the stresses produced in the wires. 1

5. Name a material which has large elastic after-effect. 1

6. a)What are the factors affecting elasticity? 2

   b) Define the terms *elastic fatigue, elastic after-effect.*

7. a) Railway tracks are laid on large-sized wooden, iron or cement sleepers. Why? 2

   b) Why does a spring balance show wrong measure after long use?

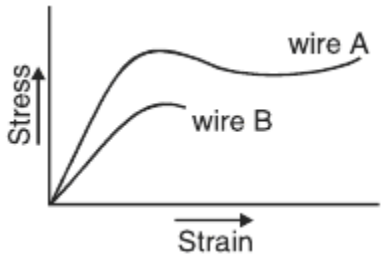
8. A wire stretches by a certain amount under a load. If the load and radius are both increased to four times, find the stretch caused in the wire. 2

9. Identical springs of steel and copper are equally stretched. In which case more work is done? 2

10. A spherical ball contracts in volume by 0.01% when subjected to a normal uniform pressure of two atmospheres. What is the bulk modulus of the material? 2

11. A wire suspended vertically from one of its ends is stretched by attaching a weight of 200 N to the lower end. The weight stretches the wire by 1mm. Find the elastic energy stored in the wire. 2

12. Stress – strain curve for two wires of material A and B are shown - 2



   a) Which material is more ductile?
   b) Which material has greater value of Young's modulus?
   c) Which of the two is stronger material?
   d) Which material is more brittle?

13. A steel wire of length 3.6 m and cross-section area 2.5 x 10^{-5} m^2 stretches by same amount as 3

copper wire of length 2.4 m and cross-section area 3.2 x 10^{-5} m^2 under a given load. What is the ratio of Young's modulus of steel to that of copper?

14. An aluminium wire of length 1 m and radius 1mm is loaded with a mass of 40 kg hanging vertically. Young's modulus of Aluminium is 7 x 10^{-10} N/m^2. Calculate- 3

    a) Tensile stress
    b) Change in length
    c) Tensile strain

15. A 5 cm cube has its upper face displaced by 0.2 cm by a tangential force of 8 N. Calculate – 3

    a) Shearing strain
    b) Shearing stress
    c) Modulus of rigidity of the material used

16. a) Represent graphically the variation of extension with load in a body. On the graph mark elastic limit, proportional limit, yield point and breaking point. 3

    b) Draw stress-strain graph of brittle and ductile bodies.

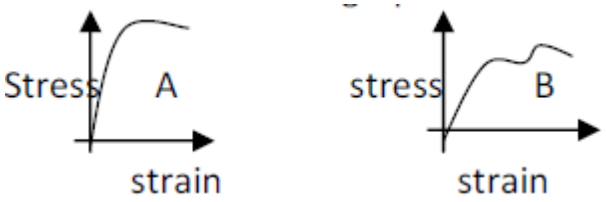
    c) Show the stress-strain curve for elastomers.

17. The pressure of a medium is changed from 1.01 X 10^5 Pa to 1.165 X 10^5 Pa and changed in volume is 10% keeping temperature constant. Find the bulk modulus of the medium. 3

18. A material has a Poisson's ratio 0.20. If a uniform rod of it suffers a longitudinal strain of 2 x 10^{-3}, then find the percentage change in volume. 3

19. An iron rod 4 m long and 0.5 m^2 in cross-section stretches 1 mm when a mass of 225 kg is hung from its lower end. Calculate Young's modulus for iron. 3

20. The stress- strain graphs for two material A and B are shown in the figure 3



Which of the material has the greater Young's modulus? And which material is more elastic?