DPP
DAILY PRACTICE PROBLEMS

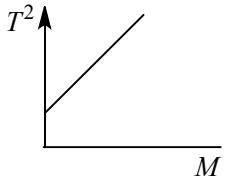
CLASS : XITH **SUBJECT : PHYSICS**
DATE : **DPP NO. :8**

Topic :- MECHANICAL PROPERTIES OF SOLIDS

1. An iron bar of length L, cross-section A and Young's modulus Y is pulled by a force F from both ends so as to produce an elongation l. Which of the following statement is correct?
   a) $l \propto Y$ b) $l \propto l/A$ c) $l \propto A$ d) $l \propto l/L$

2. Compressibility of water is 5×10^{10} m^2N^{-1}. The change in volume of 100 mL water subjected to 15×10^6 Pa pressure will
   a) No change b) Increase by 0.75 mL c) Decrease by 1.50 mL d) Decrease by 0.75 mL

3. The graph shown was obtained from the experimental measurements of the period of oscillation T for different masses M placed in the scale on the lower end of the spring balance. The most likely reason for the line not passing through the origin is that



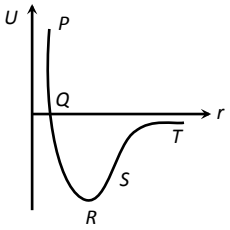
   a) Spring did not obey Hook's law b) Amplitude of oscillation was too large
   c) Clock used needed regulation d) Mass of the pan was not neglected

4. A fixed volume of iron is drawn into a wire of length L. The extension x produced in this wire by a constant force F is proportional to
   a) $\frac{1}{L^2}$ b) $\frac{1}{L}$ c) L^2 d) L

5. A beam of metal supported at the two ends is loaded at the centre. The depression at the centre is proportional to
   a) Y^2 b) Y c) $1/Y$ d) $1/Y^2$

6. To break a wire of one metre length, minimum 40 $kg\ wt$, is required. Then the wire of the same material of double radius and 6 m length will require breaking weight
   a) 80 kg-wt b) 240 kg-wt c) 200 kg-wt d) 160 kg-wt

7. The points of maximum and minimum attraction in the curve between potential energy (U) and distance (r) of a diatomic molecules are respectively



a) S and R b) T and S c) R and S d) S and T

8. Two spring P and Q of force constants k_p and $k_Q\left(k_Q = \frac{k_p}{2}\right)$ are stretched by applying forces of equal magnitude if the energy stored in Q is E, then the energy stored in P is

a) E b) $2E$ c) $E/8$ d) $E/2$

9. The material which practically does not show elastic after effect is

a) Copper b) Rubber c) Steel d) Quartz

10. An elastic material of Young's modulus Y is subjected to a stress S. The elastic energy stored per unit volume of the material is

a) $\frac{SY}{2}$ b) $\frac{S^2}{2Y}$ c) $\frac{S}{2Y}$ d) $\frac{2S}{Y}$

11. On stretching a wire, the elastic energy stored per unit volume is

a) $Fl/2AL$ b) $FA/2L$ c) $FL/2A$ d) $FL/2$

12. The bulk modulus of a metal is 8×10^9 Nm^{-2} and its density is 11 gcm^{-2}. The density of this metal under a pressure of 20,000 N cm^{-2} will be (in gcm^{-3})

a) $\frac{440}{39}$ b) $\frac{431}{39}$ c) $\frac{451}{39}$ d) $\frac{40}{39}$

13. When a weight of 5 kg is suspended from a copper wire of length 30 m and diameter 0.5 mm, the length of the wire increases by 2.4 cm. If the diameter is doubled, the extension produced is

a) 1.2 cm b) 0.6 cm c) 0.3 cm d) 0.15 cm

14. When a weight w is hung from one and of the wire other end being fixed, the elongation produced in it be l. If this wire goes over a pulley and two weights w each are hung at the two ends, the elongation of the wire will be

a) $4l$ b) $2l$ c) l d) $l/2$

15. A particular force (F) applied on a wire increases its length by 2×10^{-3}m. To increase the wire's length by 4×10^{-3}m the applied force will be

a) 4 F b) 3 F c) 2 F d) F

16. The diameter of a brass wire is 0.6 mm and Y is 9×10^6 Nm^{-2} . The force which will increase its length by 0.2% is about

a) 100 N b) 51 N c) 25 N d) None of these

17. An aluminium rod, Young's modulus 7.0×10^{9}N m^{-2}, has a breaking strain of 0.2%. The minimum cross-sectional area of the rod in m^2 in order to support a load of 10^4 N is
    a) 1×10^{-2} b) 1.4×10^{-3} c) 1.0×10^{-3} d) 7.1×10^{-4}

18. In the above graph, point D indicates
    a) Limiting point b) Yield point c) Breaking point d) None of the above

19. A steel wire of 1m long and $1mm^2$ cross section area is hang from rigid end. When weight of $1kg$ is hung from it then change in length will be (given $Y = 2 \times 10^{11} N/m^2$)
    a) 0.5 mm b) 0.25 mm c) 0.05 mm d) 5 mm

20. Hooke's law defines
    a) Stress b) Strain c) Modulus of elasticity d) Elastic limit