

Class: XI
Subject: Physics
Topic: Mechanical properties of solids
No. of Questions: 20

- Q1. There is no change in the volume of a wire due to change in its length on stretching. The Poisson's ratio of the material of the wire is
- + 0.50
 - 0.50
 - 0.25
 - 0.25
- Q2. The increase in length of a wire on stretching is 0.025%. If its Poisson ratio is 0.4, what is the percentage decrease in diameter?
- 0.01
 - 0.02
 - 0.03
 - 0.04
- Q3. An elastic ball is dropped from a height h and it rebounds many times from the floor. If the coefficient of restitution is e , the time interval between the second and the third impact, is
- ev/g
 - $e^2 v/g$
 - $e^2 \sqrt{\left(\frac{8h}{g}\right)}$
 - $e^2 \sqrt{\left(\frac{h}{g}\right)}$
- Q4. Two wires of the same length and same material but radii in the ratio 1 : 2 are stretched by unequal forces to produce equal elongation. What is the ratio of the two forces?
- 1 : 4
 - 1 : 2
 - 2 : 1
 - 4 : 5

- Q5. If the length of a rod of aluminium is 1.0 m and its area of cross-section is 5 cm^2 . Its one end is kept at 250°C and the other end at 50°C . How much heat will flow in the rod in 5 minutes? (K for Al = $2 \times 10^{-1} \text{ kJ/msec } ^\circ\text{C}$)
- 1435.4 cal
 - 630.2 cal
 - 1050.1 cal
 - 1470.6 cal
- Q6. Out of the following which is the most elastic?
- Rubber
 - Glass
 - Steel
 - Plastic
- Q7. A wire can be broken by applying a load of 200 N. The force required to break another wire of the same length and the same material, but double in diameter, is
- 200 N
 - 400 N
 - 600 N
 - 800 N
- Q8. A wire of length 2 m is made from 10 cc of copper. A force F is applied so that its length increases by 2 mm. Another wire of length 8 m is made from the same volume of copper. If the force F is applied to it, its length will increase by
- 0.8 mm
 - 1.6 cm
 - 2.4 cm
 - 3.2 cm
- Q9. When a long spring is stretched by 2 cm, its potential energy is U. If the spring is stretched by 10 cm, the potential energy in it will be
- 10 U
 - 25 U
 - U/5
 - 5 U

Q10. A wire of length L and area of cross-section A is stretched through a distance x metres by applying a force F along the length. The work done in this process is (Y is Young's modulus of the material)

- a. $\frac{1}{2}(A.L)\left(\frac{Yx}{L}\right)\left(\frac{x}{L}\right)$
- b. $(A.L)(YL)\left(\frac{x}{L}\right)$
- c. $2(A.L)(YL)\left(\frac{x}{L}\right)$
- d. $3(A.L)(YL)\left(\frac{x}{L}\right)$

Q11. Which one of the following is not a unit of Young's modulus?

- a. Nm^{-1}
- b. Nm^{-2}
- c. dyne cm^{-2}
- d. MPa

Q12. Out of the following which is the most elastic?

- a. Rubber
- b. Glass
- c. Steel
- d. Plastic

Q13. A body of mass 10 Kg is attached to a wire 0.3 m long. Its breaking stress is $4.8 \times 10^7 \text{ N / m}^2$. The area of cross section of wire is 10^{-6} m^2 . What is the maximum angular velocity with which it can be rotated in the horizontal circle?

- a. 1 rad / sec
- b. 2 rad / sec
- c. 3 rad / sec
- d. 4 rad / sec

- Q14. A wire of length 'l' meters, made of a material of specific gravity 8 is floating horizontally on the surface of water. It is not wet by water, the maximum diameter of the wire (in millimeters) upto which it can continue to float is : (surface tension of water is $T = 70 \times 10^{-3} \text{ Nm}^{-1}$)
- 1.5
 - 1.1
 - 0.75
 - 0.55
- Q15. A wire can be broken by applying a load of 200 N. The force required to break another wire of the same length and the same material, but double in diameter, is
- 200 N
 - 400 N
 - 600 N
 - 800 N}
- Q16. If the length of a rod of aluminium is 1.0 m and its area of cross-section is 5 cm^2 . Its one end is kept at 250°C and the other end at 50°C . How much heat will flow in the rod in 5 minutes? (K for Al = $2 \times 10^{-1} \text{ kJ/msec } ^\circ\text{C}$)
- 1435.4 cal
 - 630.2 cal
 - 1050.1 cal
 - 1470.6 cal}
- Q17. **Directions:** In these statements of assertion and reason mark the correct answer as:
- If both assertion and reason are true and reason is the correct explanation of assertion.
 - If both assertion and reason are true but reason is not the correct explanation of assertion
 - If reason is true but reason is false.
 - If both assertion and reason are false
- Assertion:** If earth did not have atmosphere, its average surface temperature would be lower than what is now.
- Reason:** Green house effect of the atmosphere would be absent if earth did not have atmosphere.
- (a)
 - (b)
 - (c)
 - (d)

- Q18. Which one of the following physical quantities does NOT have the dimensions of force per unit area?
- Stress
 - Strain
 - Young's modulus
 - Pressure
- Q19. A metal bar of length L and area of cross-section A is rigidly clamped between two walls. The Young's modulus of its material is Y and the coefficient of linear expansion is α . The bar is heated so that its temperature increases by θ °C. Then, the force exerted at the ends of the bar is given by
- $YL \propto \theta$
 - $YL \propto \theta/A$
 - $YA \propto \theta$
 - $Y \propto \theta/LA$
- Q20. A wire of length L is stretched by a length l when a force F is applied at one end. If the elastic limit is not exceeded, the amount of energy stored in the wire is given by
- $F \times l$
 - $1/2(F \times l)$
 - Fl^2/L
 - $1/2Fl^2/L$