St. Lawrence High School

A Jesuit Christian Minority Institution

Term : 2nd

Work Sheet – 29

Class – XI | Subject – Physics | Date – 07.11.20

Chapter – Bulk Properties of Matter | Topic – Elasticity

Choose the correct option for the following questions. $1 \times 15 = 15$

1. The bulk modulus for an incompressible liquid is
   a. Zero b. one c. infinity d. between zero and one

2. The Young's modulus of an wire of length L and radius r is Y. if the length is reduced to L/2 and radius to r/2 then its Young's modulus will be
   a. Y/2 b. Y c. 2Y d. 4Y

3. Two wires A and B of same material have radii in the ratio 2:1and lengths in the ratio 4:1. The ratio of the normal force required to produce the same change in length of these two wires is –
   a. 1:1 b. 2:1 c. 1:4 d. 1:2

4. The maximum weight a wire can sustain is W. If the wire is cut to half its value, the maximum weight it can sustain is
   a. W b. W/2 c. W/4 d. 2W

5. Identify the cause when an elastic metal rod does not undergo elongation -
   a. It is pulled with a constant acceleration on a smooth horizontal surface
   b. It is pulled with a constant velocity on a rough horizontal surface
   c. It is allowed to fall freely
   d. All of the above

6. A vessel of $10^{-3}m^3$ volume contains an oil. If a pressure of $1.2 \times 10^5 N/m^2$ is applied on it, then volume decreases by $0.3 \times 10^{-3}m^3$. The bulk modulus of the oil is
   a. $6 \times 10^{10} N/m^2$. b. $4 \times 10^5 N/m^2$. c. $2 \times 10^7 N/m^2$. d. $10^6 N/m^2$.

7. A uniform rod of area of cross section A, length L and density d is suspended vertically. The stress at the middle point of the rod is
   a. ½ dgL b. ¼ dgL c. dgL d. None of these

8. The bulk modulus of water is $2 \times 10^9 N/m^2$. The pressure required to increase the density of water by 0.1% is
   a. $2 \times 10^3 N/m^2$. b. $2 \times 10^6 N/m^2$. C. $2 \times 10^5 N/m^2$. d. $2 \times 10^7 N/m^2$.

9. A mass m is suspended from a wire. Change in length is Δl. Now the same wire is stretched to double its length and the same mass is suspended from the wire. The change in length in this case will be
   a. Δl b. $2\Delta l$ c. $4\Delta l$ d. $8\Delta l$

10. A uniform metal rod fixed at its ends of $2mm^2$ cross-section is cooled from 40^0C to 20^0C. The coefficient of linear expansion of rod is $12x10^{-6}/^0C$ and its Young's modulus is $10^{11}N/m^2$. The energy stored per unit volume of the rod is

    a. $2880J/m^3$ b. $1500J/m^3$ c.$5760J/m^3$ d. $1410J/m^3$

11. A wire of length L and area of cross section A is made of a material of Young's modulus Y. It is stretched by an amount x. The work done is

    a. $\frac{YAx}{2L}$ b. $\frac{Yx^2A}{L}$ c. $\frac{Yx^2A}{2L}$ d. $\frac{2Yx^2A}{L}$

12. Two wires A and B are made of the same material. Their lengths are in the ratio 1:2 and the diameters are in the ratio 2:1. If they are pulled by same force, their increase in lengths will be in the ratio

    a. 2:1 b. 1:4 c. 1:8 d. 8:1

13. The length of a wire is increased by applying a force, while its volume remains unchanged. The Poisson's ratio of the material of the wire is

a. $\frac{1}{4}$ b. $\frac{1}{2\sqrt{2}}$ c. $\frac{1}{2}$ d. $\frac{1}{\sqrt{2}}$

14. A wire can be broken by applying a force of 200N. The force required to break another wire of same length and same material, but double in diameter is

a. 200N b. 400N c. 600N d. 800N

15. The Poisson's ratio of a material is 0.5. If a force is applied to a wire of this material, there is a decrease in cross-sectional area by 4%. The percentage increase in length in this case is

a. 1% b. 2% c. 2.5% d. 4%

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