St. Lawrence High School

A Jesuit Christian Minority Institution

Term : 2nd

Solution of Work Sheet – 32

Class – XI   Subject – Physics   Date –21 .11.20

Chapter – Bulk Properties of Matter   Topic – Viscosity & Thermal expansion

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

1. A body achieves terminal velocity due to
   a. Gravity   b. viscosity   c. Buoyancy   d. All of these together

2. If the radius of a spherical body is doubled, then its terminal velocity will be
   a. Doubled   b. Halved   c. four times   d. same as before

3. The viscous frictional force on a spherical body is
   a. Independent of its velocity   b. directly proportional to its velocity
   c. inversely proportional to its velocity   d. None of these

4. A small metal ball of diameter 4mm and density 10.5g/cm^3 is dropped in glycerine of density 1.5g/cm^3. The ball attains a terminal velocity of 8cm/s. The coefficient of viscosity of glycerine is (in poise)
   a. 4.9   b. 9.8   c. 98   d. 980

5. A river 10m deep is flowing at 5m/s. The shearing stress between horizontal layers of the river is ($\eta = 10^{-3} in SI unit$
   a. $10^{-3} \, N/m^2$
   b. $0.8 \times 10^{-3} \, N/m^2$
   c. $0.5 \times 10^{-3} \, N/m^2$
   d. $1 N/m^2$

6. A spherical ball falls through viscous medium with terminal velocity v. if this ball is replaced by another ball of same mass but half the radius, then the terminal velocity will be (neglect the buoyancy)
   a. V   b. 2v   c. 4v   d. 8v

7. A solid sphere falls with terminal velocity 20m/s in air. If it is allowed to fall in vacuum, its terminal velocity will be
   a. 20m/s   b. more than 20m/s
   c. less than 20m/s   d. none of these

8. A brass rod when heated through 80^0C increases in length by 0.0032m. The coefficient of linear expansion of the brass is
   a. $0.00002/^0$C   b. $0.0004/^0$C   C. $0.003/^0$C   d. $0.0006/^0$C

9. A steel wire of uniform area 0.000002 m^2 is heated upto 50^0C and is stretched by tying its end rigidly. The change in tension when temperature falls from 50^0C to 30^0C is ($Y = 2 \times 10^{11} N/m^2$, $\alpha = 1.1 \times 10^{-5}/°C$)
   a. $1.5 \times 10^{10} N$ b. 5N   c. 88 N   d. $2.5 \times 10^{10} N$

10. A rectangular block is heated from 0^0C to 100^0C. the percentage increase in length is 0.3%. the percentage increase in its volume is
   a. 0.3%   b. 0.2%   c. 0.4%   d. 0.9%

11. A sheet of metal 0.5m long and 0.2m broad at 0^0C is heated to 100°C. The area of surface increases by $2.8 \times 10^{-4} m^2$. The α of the material is
   a. 1.9×10^{-5}/°C   b. 1.4×10^{-5}/°C   c. 2.9×10^{-5}/°C   d. 4×10^{-5}/°C

12. Railway lines are laid with gaps. If the gap between steel rails 0.5m long be 0.03m at 30°C, then the temperature at which lines touch is ($\alpha = 12 \times 10^{-6}$/°C)
   a. 40°C   b. 60°C   c. 70°C   d. 80°C

13. A hole is drilled in a copper sheet of diameter 0.052m at 30°C. The change in diameter when temperature is increased to 330°C is ($\alpha = 1.7 \times 10^{-5}$/°C)
   a. $4.22 \times 10^{-5} m$ b. $2.65 \times 10^{-5} m$ c. $5.3 \times 10^{-5} m$ d. $2.65 \times 10^{-4} m$

14. An iron tyre is to be fitted on a wooden wheel of diameter 1.2m. The diameter of the tyre is0.006m smaller than that of the wheel. Temperature by which iron tyre is to be heated ($\alpha = 12 \times 10^{-6}$/°C)
   a. 209.4°C   b. 418.8°C   c. 420.6°C   d. 416.7°C

15. If the volume of a block of metal changes by 0.18% when heated through 30°C, then its α is
   a. 4×10^{-5}/°C   b. 6×10^{-5}/°C   c. 3×10^{-5}/°C   d. 2×10^{-5}/°C

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