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Physics Assignment-Chapter 2: Units and Measurements

1. The damping force on an oscillator is directly proportional to the velocity. The units of the constant of proportionality are

(a) $kg\ m\ s^{-1}$ (b) $kg\ m\ s^{-2}$ (c) $kg\ s^{-1}$ (d) $kg\ s$

2. The unit of permittivity of free space, ε_0, is

(a) coulomb/neuton-metre (b) newton-metre^2/coulomb^2

(c) coulomb^2/newton-metre^2 (d) coulomb^2/(newton-metre)^2

3. A screw gauge gives the following readings when used to measure the diameter of a wire

Main scale reading: 0 mm

Circular scale reading: 52 divisions

Given that 1 mm on main scale corresponds to 100 divisions on the circular scale. The diameter of the wire from the above data is

(a) 0.052 cm (b) 0.52 cm (c) 0.026 cm (d) 0.26 cm

4. In an experiment, the percentage of error occurred in the measurement of physical quantities A, B, C and D are 1%, 2%, 3% and 4% respectively. Then the maximum percentage of error in the measurement X where

$X = \frac{A^2 B^{1/2}}{C^{1/3} D^3}$, will be

(a) 10% (b) (3/13) % (c) 16% (d) -10%

5. If the error in the measurement of radius of a sphere is 2%, then the error in the determination of volume of the sphere will be

(a) 8% (b) 2% (c) 4% (d) 6%

6. The area of rectangular field (in m^2) of length 55.3 m and breadth 25 m after rounding off the value for correct significant digit is-

(a) 138×10^1 (b) 1382 (c) 1382.5 (d) 14×10^2

7. Taking into account of the significant figures, what is the value of 9.99 m-0.0099 m?

(a) 9.9801 m (b) 9.98 m (c) 9.980 m (d) 9.9 m

8. Plane angle and solid angle have

(a) Units but no dimensions (b) Dimensions but no units

(c) No units and no dimensions (d) Both units and dimensions

9. Dimensions of stress are

(a) $[MLT^{-2}]$ (b) $[ML^2T^{-2}]$ (c) $[ML^0T^{-2}]$ (d) $[ML^{-1}T^{-2}]$

10. If the dimensions of a physical quantity are given by $M^aL^bT^c$, then the physical quantity will be

(a) velocity if $a = 1, b = 0, c = -1$

(a) acceleration if $a = 1, b = 1, c = -2$

(a) force if $a = 0, b = -1, c = -2$

(d) pressure if $a = 1, b = -1, c = -2$

11. Dimensions of resistance in an electrical circuit, in terms of dimension of mass M, of length L, of time T and of current I, would be

(a) $[ML^2T^{-2}]$ (b) $[ML^2T^{-1}I^{-1}]$ (c) $[ML^2T^{-3}I^{-2}]$ (d) $[ML^2T^{-3}I^{-1}]$

12. Which pair do not have equal dimensions?

(a) Energy and torque (b) Force and impulse

(c) angular momentum and planck's constant (d) elastic modulus and pressure

13. The dimensions of RC is

(a) square of time (b) Square of inverse time (c) time (d) inverse time

14. Of the following quantities, which one has dimensions different from the remaining three?

(a) Energy per unit volume (b) Force per unit area

(c) Product of voltage and charge per unit volume

(d) angular momentum

15. According to newton, the viscous force acting between liquid layers of area A and velocity gradient $\frac{\Delta v}{\Delta Z}$ is given by $F = -\eta A \frac{\Delta v}{\Delta Z}$, where η is constant called coefficient of viscosity. The dimensional formula of η is

(a) $[ML^{-2}T^{-2}]$ (b) $[M^0L^0T^0]$ (c) $[ML^2T^{-2}]$ (d) $[ML^{-1}T^{-1}]$

16. If force (F), velocity (V) and time (T) are taken as fundamental units, then the dimensions of mass are-

(a) $[FVT^{-1}]$ (b) $[FVT^{-2}]$ (c) $[FV^{-1}T^{-1}]$ (d) $[FV^{-1}T]$

17. The velocity v of a particle at time t is given by $v = at + \frac{b}{t+c}$, where a, b and c are constants. The dimensions of a, b, and c are

(a) $[L], [LT]$ and $[LT^{-2}]$ (b) $[LT^{-2}], [L]$ and $[T]$

(c) $[L^2], [T]$ and $[LT^{-2}]$ (d) $[LT^{-2}], [LT]$ and $[L]$

18. An equation is given here $\left(p + \frac{a}{V^2}\right) = b\frac{\theta}{V}$ where p= pressure, V= volume and θ= absolute temperature. If a and b are constants, the dimensions of a will be

(a) $[ML^{-5}T^{-1}]$ (b) $[ML^5T^1]$ (c) $[ML^5T^{-2}]$ (d) $[M^{-1}L^5T^2]$

19. Which of the following is a dimensional constant?

(a) Relative density (b) Gravitational constant

(c) Refractive index (d) Poisson's ratio

20. If $x = at + bt^2$, where x is the distance travelled by the body in kilometers while t is the time in seconds, then the units of b is

(a) km/s (b) km s (c) km/s^2 (d) km s^2