Topic :- UNITS AND MEASUREMENTS

1. Dimensions of bulk modulus are
   a) $[M^{-1}LT^{-2}]$ b) $[ML^{-1}T^{-2}]$ c) $[ML^{-2}T^{-2}]$ d) $[M^2L^2T^{-1}]$

2. Resistance of a given wire is obtained by measuring the current flowing in it and the voltage difference applied across it. If the percentage errors in the measurement of the current and the voltage difference are 3% each, then error in the value of resistance of the wire is
   a) 6%   b) Zero   c) 1%   d) 3%

3. 'Torr' is the unit of
   a) Pressure   b) Volume   c) Density   d) Flux

4. The SI unit of length is the metre. Suppose we adopt a new unit of length which equal x metre. The area of 1 m^2 expressed in terms of the new unit has a magnitude
   a) x b) x^2 c) x^{-1} d) x^{-2}

5. The velocity of a particle v at an instant t is given by $v = at + bt^2$ the dimension of b is
   a) $[L]$ b) $[LT^{-1}]$ c) $[LT^{-2}]$ d) $[LT^{-3}]$

6. The dimensions of electric potential are
   a) $[ML^2T^{-2}Q^{-1}]$ b) $[MLT^{-2}Q^{-1}]$ c) $[ML^2T^{-1}Q]$ d) $[ML^2T^{-2}Q]$

7. If the radius of the sphere is $(5.3 \pm 0.1)cm$. Then percentage error in its volume will be
   a) $3 + 6.01 \times \frac{100}{5.3}$ b) $\frac{1}{3} \times 0.01 \times \frac{100}{5.3}$ c) $\left(\frac{3 \times 0.01}{5.3}\right) \times 100$ d) $\frac{0.1}{5.3} \times 100$

8. If the velocity v (is cms^{-1}) of a particle is given in terms of t (in second) by the relation
   $$v = at + \frac{b}{t + c}$$
   then, the dimensions of a, b and c are

        a b c
   a) $[L]$ $[LT]$ $[T^2]$ b) $[L^2]$ $[T]$ $[LT^{-2}]$

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

9. $\frac{h}{2\pi}$ is the dimension of
   a) Velocity   b) Momentum   c) Energy   d) Angular momentum

10. If $E =$ energy, $G =$ gravitational constant, $I =$ impulse and $M =$ mass, then dimensions of $\frac{GIM^2}{E^2}$ are same as that of
    a) Time   b) Mass   c) Length   d) Force

11. A public park, in the form of a square, has an area of $(100 \pm 0.2)m^2$. The side of park is
    a) (10 ± 0.01)m   b) (10 ± 0.1)m   c) (10.0 ± 0.1)m   d) (10.0 ± 0.2)m

12. Ins is defined as
    a) 10^{-9} s of Kr $-$ clock of 1650763.73 oscillations
    b) 10^{-9} s of Kr $-$ clock of 6521389.63 oscillations
    c) 10^{-9} s of Cs $-$ clock of 1650763.73 oscillations
    d) 10^{-9} s of Cs $-$ clock of 9192631770 oscillations

13. If the dimensions of a physical quantity are given by $M^a L^b T^c$, then the physical quantity will be
    a) Pressure if $a = 1, b = -1, c = -2$ b) Velocity if $a = 1, b = 0, c = -1$
    c) Acceleration if $a = 1, b = 1, c = -2$ d) Force if $a = 0, b = -1, c = -2$

14. The relative density of material of a body is found by weighing it first in air and then in water. If the weight in air is $(5.00 \pm 0.05)\ newton$ and weight in water is $(4.00 \pm 0.05)\ newton$ .Then the relative density along with the maximum permissible percentage error is
    a) $5.0 \pm 11\%$ b) $5.0 \pm 1\%$ c) $5.0 \pm 6\%$ d) $1.25 \pm 5\%$

15. Identify the pair which has different dimensions
    a) Planck's constant and angular momentum   b) Impulse and linear momentum
    c) Angular momentum and frequency   d) Pressure and Young's modulus

16. In which of the following system of units, *weber* is the unit of magnetic flux
    a) CGS   b) MKS   c) SI   d) None of these

17. The equation of state of some gases can be expressed as $\left(P + \frac{a}{V^2}\right) = \frac{R\theta}{V}$. Where P is the pressure, V the volume, θ the absolute temperature and a and b are constants. The dimensional formula of a is
    a) $[ML^5 T^{-2}]$ b) $[M^{-1} L^5 T^{-2}]$ c) $[ML^{-1} T^{-2}]$ d) $[ML^{-5} T^{-2}]$

18. If E, M, L and G denote energy, mass, angular momentum and gravitational constant respectively, then the quantity $(EL^2/M^5 G^2)$ has the dimensions of

a) Angle   b) Length   c) Mass   d) Time

19. The physical quantity which has the dimensional formula $[M^1T^{-3}]$ is
    a) Surface tension   b) Density   c) Solar constant   d) Compressibility

20. The percentage errors in the measurement of a mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimate of kinetic energy obtained by measuring mass and speed?
    a) 11%   b) 8%   c) 5%   d) 1%