PHYSICS

Q.1 Which of the following physical quantities has neither dimensions nor unit ?
(A) angle
(B)Luminous intensity
(C) coefficient of friction
(D) current **[C]**

Q.2 The dimensional formula of latent heat is –
(A) $M^0L^2T^{-2}$ (B) ML^2T^{-1}
(C) MLT^{-1} (D) $M^0L^2T^{-1}$ **[A]**

Q.3 The dimensional formula of angular momentum is–
(A) ML^2T^{-2} (B) MLT^{-2}
(C) ML^2T^{-2} (D) ML^2T^{-1} **[B]**

Q.4 A pressure of 10^6 dynes/cm^2 is equivalent to
(A) 10^5 N/m^2 (B) 10^4 N/m^2
(C) 10^6N/m^2 (D) 10^7N/m^2 **[A]**

Q.5 Which one of the following has the dimensions of $[ML^{-1}T^{-2}]$
(A) torque (B) surface tension
(C) viscosity (D) stress **[D]**

Q.6 If C and L denote the capacitance and inductance, then the units of LC are –
(A) $M^0L^0T^2$ (B) $M^0L^2T^{-2}$
(C) MLT^{-2} (D) M^0L^0T **[A]**

Q.7 The dimensions of torque are –
(A) $[MLT^{-2}]$ (B) $[ML^{-1}T^{-2}]$
(C) $[ML^2T^{-2}]$ (D) $[ML^{-2}T^{-2}]$ **[C]**

Q.8 The frequency of vibrations of a mass m suspended from a spring of spring constant k is given by $\nu = cm^x k^y$, where c is a dimensionless constant. The values of x and y are respectively.
(A) $\frac{1}{2}, \frac{1}{2}$ (B) $-\frac{1}{2}, -\frac{1}{2}$
(C) $\frac{1}{2}, -\frac{1}{2}$ (D) $-\frac{1}{2}, \frac{1}{2}$ **[D]**

Q.9 The velocity v of a particles is given in terms of time t by the equation.
$\mathbf{v} = at + \frac{b}{t+c}$. The dimension of a, b and c are
(A) L^2, T, $L\,T^2$ (B) LT^2, LT, L
(C) LT^{-2}, L, T (D) L, LT, T^2 **[C]**

Q.10 Which of the following pairs of physical quantities have different dimensions.
(A) Stress, pressure
(B) Young's modulus, energy
(C) Density, relative density
(D) Energy, torque **[C]**

Q.11 Which of the following pairs have identical dimensions
(A) Momentum and force
(B) Pressure and surface tension
(C) Moment of force and angular momentum
(D) Surface tension and surface energy **[D]**

Q.12 if force F, acceleration A and time T are basic physical quantities, the dimensions of energy are –
(A) $[F^2A^{-1}T]$ (B) $[FAT^2]$
(C) $[FAT^{-2}]$ (D) $[FA^{-1}T]$ **[B]**

Q.13 The dimensional formula of resistivity of Conductor is –
(A) $[ML^2T^{-2}A^{-2}]$ (B) $[ML^3T^{-3}A^{-2}]$
(C) $[ML^{-2}T^{-3}A^{-2}]$ (D) $[ML^2T^{-2}A^{-3}]$ **[B]**

Q.14 The dimensions of $\frac{1}{2}\varepsilon_0 E^2$($\varepsilon_0$ = permittivity of free space and E = electric field) are –
(A) $[ML^2T^{-1}]$ (B) $[ML^{-1}T^{-2}]$
(C) $[ML^2T^{-2}]$ (D) $[MLT^{-1}]$ **[B]**

Q.15 If force (F), length (L) and time (T) be considered fundamental units, then units of mass will be –
(A) $[F\,L^{-1}T^{-2}]$ (B) $[F^2\,L\,T^{-2}]$
(C) $[F\,L\,T^{-2}]$ (D) $[F\,L^{-2}\,T^{-1}]$ **[A]**

Q.16 Which of the following pairs do not have identical dimensions –
(A) Pressure and stress
(B) Work and pressure energy
(C) Angular momentum and Plank's constant

(D) Moment of force and momentum **[D]**

Q.17 The product (PV) has the dimensions –
(A) $[ML^{-1}T^{-2}]$ (B) $[M^1L^2T^{-2}]$
(C) $[M^1L^2T^{-2}]$ (D) $[M^1L^2T^{-3}]$ **[C]**

Q.18 kg m/s^2 stand for the unit of –
(A) Energy (B) acceleration
(C) Force (D) Momentum **[C]**

Q.19 In the SI system, the unit of temperature is –
(A) Degree centigrade (B) Degree Celsius
(C) Kelvin (D) Degree Fahrenheit **[C]**

Q.20 The dimensional formula for impulse is –
(A) $[M\,L\,T^{-1}]$ (B) $[M\,L\,T^{-2}]$
(C) $[M\,L^2\,T^{-1}]$ (D) $[M^2\,L\,T^{-1}]$ **[A]**

Q.21 Choose the physical quantity that is different from others –
(A) Moment of Inertia
(B) Electric current
(C) Pressure energy
(D) Rate of change of velocity **[D]**

Q.22 The frequency (n) of vibration of a string is given as $n = \frac{1}{2\ell}\sqrt{\frac{T}{m}}$, where T is tension and ℓ is the length of vibrating string, then the dimensional formula for m is –
(A) $[M^0L^1T^1]$ (B) $[M^0L^0T^0]$
(C) $[M^1L^{-1}T^0]$ (D) $[ML^0T^0]$ **[C]**

Q.23 In the relation y = r sin (ωt – kx) the dimensions of $\frac{\omega}{k}$ are–
(A) $[M^0L^0T^0]$ (B) $[M^0L^1T^{-1}]$
(C) $[M^0L^0T^1]$ (D) $[M^0L^1T^0]$ **[B]**

Q.24 Dimensions of $\in_0\mu_0$ are –
(A) $[L\,T^{-1}]$ (B) $[L\,T^{-2}]$
(C) $[L^2T^{-2}]$ (D) $[L^{-2}\,T^2]$ **[D]**

Q.25 The equation of state of a real gas can be expressed as $\left(P+\frac{a}{V^2}\right)(V-b) = cT$, where P is the pressure, V the volume, T the absolute temperature and a, b, c are constants. What are the dimensions of 'a'–
(A) $M^0\,L^3\,T^{-2}$ (B) $M\,L^{-2}\,T^5$
(C) $M\,L^5\,T^{-2}$ (D) $M^0\,L^3\,T^0$ **[C]**

Q.26 What is the physical quantity whose dimensions are $M\,L^2\,T^{-2}$ –
(A) Pressure (B) Kinetic energy
(C) Power (D) Momentum **[B]**

Q.27 If the velocity (V), acceleration (A) and force (F) are taken as fundamental quantities instead of mass (M), length (L) and time (T), the dimensions of Young's modulus would be –
(A) $FA^2\,V^{-4}$ (B) $FA^2\,V^{-5}$
(C) $FA^2\,V^{-3}$ (D) $FA^2\,V^{-2}$ **[A]**

Q.28 If L, R, C and V respectively represent inductance, resistance, capacitance and potential difference then the dimensions of $\frac{L}{RCV}$ are the same as those of –
(A) Charge (B) $\frac{1}{\text{Charge}}$
(C) Current (D) $\frac{1}{\text{Current}}$ **[D]**

Q.29 A gas bubble from an explosion under water oscillates with a period proportional to $P^a\,d^b\,E^c$, where P is the static pressure, d is the density of water and E is the energy of explosion. Then a, b, c are respectively –
(A) 1, 1, 1 (B) $\frac{1}{3},\frac{1}{2},\frac{-5}{6}$
(C) $\frac{-5}{6},\frac{1}{2},\frac{1}{3}$ (D) $\frac{1}{2},\frac{-5}{6},\frac{1}{3}$ **[A]**

Q.30 Subtract 0.2 J from 5.27 J and express the result with correct number of significant figures -
(A) 5.1 J (B) 5.06 J
(C) 5.0 J (D) 5 J **[A]**

Q.31 Error in the measurement of radius of a sphere is 2%. Then error in the measurement of volume is -
(A) 2% (B) 4%
(C) 8% (D) 6% **[D]**

Q.32 The velocity v of waves produced in water depends on their wavelength λ, the density of

water ρ, and acceleration due to gravity g. The square of velocity is proportional to -

(A) $\lambda^{-1}g^{-1}\rho^{-1}$ (B) λg

(C) $\lambda\rho g$ (D) $\lambda^2 g^{-2}\rho^{-1}$ **[B]**

Q.33 The maximum error in the measurement of mass and length of the side of a cube are 2% and 1% respectively. The maximum error in its density is-

(A) 2% (B) 1% (C) 3% (D) 5%

[D]

Q.34 The equation $\frac{dv}{dt} = At - Bv$ is describing the rate of change of velocity of a body falling from rest in a resisting medium. The dimensions of A and B are -

(A) LT^{-3}, T (B) LT^{-3}, T^{-1}

(C) LT, T (D) LT, T^{-1} **[B]**

Q.35 If x = a – b, the maximum percentage error in the measurement of x will be -

(A) $\left(\frac{\Delta a}{a}+\frac{\Delta b}{b}\right)\times 100\%$

(B) $\left(\frac{\Delta a}{a}-\frac{\Delta b}{b}\right)\times 100\%$

(C) $\left(\frac{\Delta a}{a-b}+\frac{\Delta b}{a-b}\right)\times 100\%$

(D) $\left(\frac{\Delta a}{a-b}-\frac{\Delta b}{a-b}\right)\times 100\%$ **[C]**

Q.36 When 96.54 is divided by 2.40, the correct result is -

(A) 40.2250 (B) 40.225

(C) 40.23 (D) 40.2 **[D]**

Q.37 The velocity 'v' of a particle at time t is given by, $v = \frac{a}{t} + \frac{bt}{t^2+c}$. The dimensions of a, b, c are respectively -

(A) LT^{-2}, L, T (B) L, L, T^2

(C) L, LT, T^{-2} (D) L, L, LT^2 **[B]**

Q.38 The time dependence of physical quantity P is given by $P = P_0\ e^{-\alpha t^2+\beta t+\gamma}$, where α, β, γ are constants and their dimensions are given by (where t is time) -

(A) $M^0 L^0 T^{-2}$, $M^0 L^0 T^{-1}$, $M^0 L^0 T^0$

(B) $M^0 L^{-1}, T^{-2}$, $M^0 L^0 T^{-1}$, $M^0 L^0 T$

(C) $M^0 L^0 T^{-1}$, M L T^{-2}, $M^0 L^0 T^{-1}$

(D) M, L, T, M L T^0, $M^0 L^0 T^0$ **[A]**

Q.39 The potential energy of a particle varies with distance x from a fixed origin as $V = \frac{A\sqrt{x}}{x+B}$ where A and B are constants. The dimensions of AB are -

(A) $ML^{5/2} T^{-2}$ (B) $M^1L^2T^{-2}$

(C) $M^{3/2} L^{5/2} T^{-2}$ (D) $M^1L^{7/2}T^{-2}$ **[D]**

Q.40 Error in measurement of radius of a sphere is 1%. Then error in measurement of area is-

(A) 2% (B) 3%

(C) 4 % (D) 5% **[A]**

Q.41 The time period of a body under S.H.M. is represented by : $T = P^\alpha D^\beta S^\gamma$ where P is pressure, D is density and S is surface tension, then values of α, β and γ are -

(Surface tension $S = \frac{F}{\ell}$)

(A) $-\frac{3}{2}, \frac{1}{2}, 1$ (B) $1, 2, \frac{1}{3}$

(C) –1,–2 , 3 (D) $\frac{1}{2}, \frac{-3}{2}, \frac{-1}{2}$ **[A]**

Q.42 If x = ab, the maximum percentage error in the measurement of x will be-

(A) $\left(\frac{\Delta a}{a}\times 100\%\right)\times\left(\frac{\Delta b}{b}\times 100\%\right)$

(B) $\left(\frac{\Delta a}{a}\times 100\%\right)\div\left(\frac{\Delta b}{b}\times 100\%\right)$

(C) $\left(\frac{\Delta a}{a}-\frac{\Delta b}{b}\right)\times 100\%$

(D) $\left(\frac{\Delta a}{a}+\frac{\Delta b}{b}\right)\times 100\%$ **[D]**

Q.43 The percentage errors in measurement of mass and speed are 3 % and 2% respectively. The error in kinetic energy will be-

(A) 6% (B) 7 %

(C) 10% (D) 12% **[B]**

Q.44 What is the fractional error in g calculated from $T = 2\pi\sqrt{\ell/g}$? Given fraction errors in T and ℓ are ± x and ± y respectively-

(A) x + y (B) 2x – y

(C) 2x + y (D) x – 2y **[C]**

Q.45 In the equation $\left(P + \frac{a}{V^2}\right)(V–b)$ = constant, the unit (s) a is/are-

(A) N m^5 (B) N m^4

(C) N m^3 (D) N m^2 **[B]**

Q.46 If P = 2.347 cm, Q = 2.4 cm, then P + Q =

(A) 4.747 (B) 4.75

(C) 4.8 (D) 4.7 **[C]**

Q.47 Which physical quantities have same dimensions?

(A) Torque and work

(B) Force and power

(C) Latent heat and specific heat

(D) Work and power **[A]**

Q.48 The wavelength associated with a moving particle depends upon power p of its mass m, qth power of its velocity v and rth power of Planck's constant h. Then the correct set of values of p, q and r is –

(A) p =1, q = – 1, r = 1

(B) p = 1, q = 1, r = 1

(C) p = –1, q = –1, r = –1

(D) p = –1, q = –1, r = 1 **[D]**

Q.49 Which of the following is the most accurate ?

(A) 200.0m (B) 20×10^1m

(C) 2×10^2m (D) Data is inadequate

[A]

Q.50 The number of significant figures in 0.01020 is

(A) 3 (B) 4

(C)5 (D) 6 **[B]**