

PHYSICS

SHEET-01 : (U & D)

1. Speed (v) of particle is given as $v = Ae^{-Bt}$, where t is time, then [A] and [B] are respectively :-
 (A) LT^{-1}, T^{-1} (B) L, T^{-1}
 (C) T^{-1}, LT^{-1} (D) LT, T
2. The force F of a particle at time t is given by $F = at + \frac{b}{(t+c)}$, where a, b, and c are constant, dimensions of a, b and c are respectively :-
 (A) $ML^{-3}T, MLT^{-1}, T$ (B) $MLT^{-3}, ML^{-1}T, T$
 (C) $M^{-3}LT, M^{-1}LT, T$ (D) MLT^{-3}, MLT^{-1}, T
3. Which of the following is not a unit of time?
 (A) Attosecond (B) Sidereal year
 (C) lunar month (D) parsec
4. If K represents kinetic energy, V represents velocity and T represents time, and these are chosen as the fundamental units then, the dimensional formula of surface tension is (Given : surface tension is force per unit length) :-
 (A) $[KV^{-2}T^{-2}]$ (B) $[KV^{-1}T^{-2}]$
 (C) $[K^2V^{-1}T^{-3}]$ (D) $[KV^{-2}T^{-1}]$
5. Velocity of a particle depend on time t according to equation :-

$$V = \sqrt{ab} + bt + \frac{c}{d+t}$$
 The a, b, c and d represents the following quantities in order :-
 (A) Distance, distance, acceleration, time
 (B) Acceleration, distance, time, distance
 (C) Acceleration, distance, distance, time
 (D) Distance, acceleration, distance, time
6. The atmospheric pressure in SI units is 1.01×10^5 Pascal. Its value in CGS units is :
 (A) 1.01×10^4 dyne/cm²
 (B) 1.01×10^5 dyne/cm²
 (C) 1.01×10^6 dyne/cm
 (D) 1.01×10^6 dyne/cm²
7. Suppose we employ a system in which the unit of mass equals 100 kg, the unit of length equals 1 km and the unit of time 100 sec and call the unit of energy as eluoj (joule written in reverse order), then what is the relation between eluoj and joule?
 (A) 1 eluoj = 10^4 joule
 (B) 1 joule = 10^4 eluoj
 (C) 1 eluoj = 10^3 joule
 (D) 1 joule = 10^3 eluoj
8. If P represents radiation pressure, C represents the speed of light, and Q represents radiation energy striking a unit area per sec, where x, y, z are non-zero integers such that $(P^x Q^y C^z)$ is dimensionless. Find the value of x, y and z.
 (A) $x = -1, y = -1, z = -1$
 (B) $x = 1, y = -1, z = 1$
 (C) $x = -1, y = -1, z = -1$
 (D) $x = 1, y = 1, z = 1$
9. In a hypothetical set of units
 1 star joule = 10^3 joule
 1 star Newton = 10^4 Newton
 1 star second = 10 second
 Then one meter is equivalent to
 (A) 100 star meter (B) 1000 star meter
 (C) 10 star meter (D) $\frac{1}{10}$ star meter

10. The ratio of 3 MJ (mega joule) energy and 2 ns (nanosecond) is given as :
- (A) $1.5 \times 10^3 \text{ W}$ (B) $1.5 \times 10^{15} \text{ N}$
 (C) $1.5 \times 10^3 \text{ N}$ (D) $1.5 \times 10^{15} \text{ W}$
11. Which of the following is incorrect statement?
- (A) a dimensionally correct equation may be correct
 (B) a dimensionally correct equation may be incorrect
 (C) a dimensionally incorrect equation may be correct
 (D) a dimensionally incorrect equation is incorrect
12. Dimensional formula for spring constant $k = \left(\frac{F}{x} \right)$ (where x = change in length) is $M^a L^b T^c$. Then find the value of $\frac{a-b}{c-b}$.
- (A) $\frac{1}{2}$ (B) -1 (C) 1 (D) $-\frac{1}{2}$
13. If the speed v of a particle of mass m as function of time t is given by $v = \omega A \sin \left[\left(\sqrt{\frac{k}{m}} \right) t \right]$.
 Where A has dimension of length.
- (A) $\sqrt{\frac{k}{m}} t$ must be a dimensionless quantity
 (B) Dimensional formula of ω is LT^{-1}
 (C) Dimensional formula of k is MLT^{-2}
 (D) Dimensional formula of $\sqrt{\frac{k}{m}}$ is T
14. We have a composite physical quantity defined as $Q = \frac{Fv^2}{W}$, where F is force, v is speed and W is work. Then the dimension of Q matches with which of these:
- (A) Linear momentum (B) Energy per unit area
 (C) Acceleration (D) Pressure
15. In a certain system of units, 1 unit of time is 20 sec, 1 unit of mass is 20 kg and 1 unit of length is 20 m. In this system, one unit of power will correspond to
- (A) 20 watts (B) $\frac{1}{20}$ watts
 (C) 400 watts (D) 1 watts