

SUMMER VACATION ASSIGNMENT

CLASS: XI

SUBJECT – PHYSICS

Q1. Why length , mass and time are chosen as base quantity in mechanics?

Q2. Why do we have different units for the same physical quantity?

Q3. Which of the following are not a unit of time ?

- (a) Seconds
- (b) Parsec
- (c) Year
- (d) Light year

Q4. If the unit of force is 100N, unit of length is 10m and unit of time is 100 sec, what is the unit of mass in this system of units?

Q5. Which of the following ratios express pressure?

- (a) Force/Area**
- (b) Energy/Volume**
- (c) Energy/Area**
- (d) Force/Volume**

Q6. Write the dimensions of :

- (a) Surface tension
- (b) Coefficient of elasticity
- (c) Strain
- (d) Coefficient of viscosity
- (e) Universal constant of Gravitation

- (f) Pressure energy
- (g) Moment of Inertia

Q7. Photon is a quantum of radiation with energy $E = h\nu$ where ν is the frequency and h is Planck's constant.

The dimensions of h are the same as that of

- (a) Linear impulse**
- (b) Angular impulse**
- (c) Linear momentum**
- (d) Angular momentum**

Q8. Fill in the blanks by suitable conversion of units :

- (a) $1 \text{ kg m}^2 \text{ s}^{-2} = \dots \text{ g cm}^2 \text{ s}^{-2}$
- (b) $1 \text{ m} = \dots \text{ ly}$
- (c) $3.0 \text{ m s}^{-2} = \dots \text{ km h}^{-2}$
- (d) $G = 6.67 \times 10^{-11} \text{ N m}^2 (\text{kg})^{-2} = \dots (\text{cm})^3 \text{ s}^{-2} \text{ g}^{-1}$.

Q9. Give an example of :

- (a) a physical quantity which has a unit but no dimensions**
- (b) a physical quantity which has neither unit nor dimensions**
- (c) a constant which has a unit**
- (d) a constant which has no unit**

Q10. The displacement of a progressive wave is represented by

$Y = A \sin(\omega t - Kx)$ where x is distance and t is time. Write the dimensional formula of (i) ω & (ii) K

Q11. Convert a force of 1N into dyne.

Q12. Check the correctness of relation $t = 2\pi \sqrt{l/g}$ where l is the length and t is the time period of a simple pendulum; g is acceleration due to gravity.

Q13.

In the expression $P = El^2m^{-5}G^{-2}$; E , m , l and G denote energy, mass, angular momentum and gravitational constant, respectively. Show that P is a dimensionless quantity.

Q14. Check the correctness of the relation $v^2 - u^2 = 2as$, where the symbols have their usual meaning.

Q15. The SI unit of energy is $J = \text{kgm}^2\text{s}^{-2}$, that of speed v is ms^{-1} and of acceleration a is ms^{-2} . Which of the formulae for kinetic energy (K) given below can you rule out on the basis of dimensional arguments (m stands for the mass of the body).

(a) $K = m^2v^3$

(b) $K = \frac{1}{2}mv^2$

(c) $K = ma$

(d) $K = \frac{3}{16}mv^2$

(e) $K = \frac{1}{2}mv^2 + ma$