

CLASS XI PHYSICS CHAPTER 1. UNITS AND MEASUREMENT

ANSWER KEY

Ans 1 A. Choose the correct option:

- i) b) Parsec is the unit of distance.
- ii) b) Friction, air resistance, tension and thrust are the forces. SI unit of tension is newton.
- iii) c) Dimensional formula for linear momentum is $[MLT^{-1}]$.
- iv) c) The dimensional formula for pressure gradient is $[ML^{-2}T^{-2}]$.
- v) b) The significant figures in the number 20340 are 4.

ANSWERS TO SHORT ANSWER TYPE QUESTIONS (1 MARK AND 2 MARKS)

2. Those physical quantities which can be expressed in terms of fundamental quantities are called derived quantities and their units are called fundamental units. Example: speed, area, acceleration, pressure are examples of derived quantities.

3. Parsec = 206264.806 A. U
4. 1 parsec = 3.262 light years.
5. Parsec
6. When $x = at + bt^2$, where x is in metres and t in seconds, unit of a will be m/s and of b will be m/s^2 . The units of L.H.S and R.H.S should be equal.
7. The dimensional formula for Gravitational constant is $[M^{-1}L^3T^{-2}]$.
8. The dimensional formulae for
 - i) Pressure is $[ML^{-1}T^{-2}]$
 - ii) Power is $[ML^2T^{-3}]$
 - iii) Density is $[ML^{-3}T^0]$
 - iv) Angle is
9. Relative density, Specific gravity, Strain, Trigonometric ratios.
10. The number of significant figures in i) 125 is 3 ii) 0.20 is 2 iii) 3750 is 3
iv) 8.27×10^{-11} is 3.
11. i) 20.46 m = 20.5 m ii) 30.68 m = 30.7 m iii) 30.55m = 30.6 m.

ANSWER TO LONG ANSWER TYPE QUESTIONS (FOR 3 MARKS AND 5 MARKS)

12. The main characteristics of SI

- It should have international acceptance
- It should be of convenient size.
- It should be accepted by the general conference of the measurement and units.

- The SI units are coherent, that is there is only one unit for each physical quantity, and units of different quantities are combined without conversion factors.
- The SI system is a rational system.

13. The dimensional formula for torque = $[ML^2T^{-2}]$, coefficient of viscosity $[ML^{-1}T^{-1}]$, surface tension $[ML^0T^{-2}]$, angular momentum $[ML^2T^{-1}]$.

14. Dimension of energy is $[ML^2T^{-2}]$. To convert 10 ergs into joule

C.G.S

S.I

$$M_1 = 1 \text{ gm}$$

$$M_2 = 1 \text{ Kg}$$

$$L_1 = 1 \text{ cm}$$

$$L_2 = 1 \text{ m}$$

$$T_1 = 1 \text{ sec}$$

$$T_2 = 1 \text{ sec}$$

$$n_1 = 10$$

$$n_2 = ?$$

$$n_2 = n_1 (M_1/M_2)^a (L_1/L_2)^b (T_1/T_2)^c$$

$$= 10(1 \text{ gm}/1000 \text{ gm}) (1 \text{ cm}/100 \text{ cm})^2 (1 \text{ sec}/1 \text{ sec})^{-2}$$

$$= 10 \times 10^{-3} \times (10^{-2})^2 = 10^{-6} \text{ Joule.}$$

15. $T = \sqrt{l/g}$,

Dimension of LHS = $[M^0L^0T^1]$

Dimension of RHS = $\{[L]/[LT^{-2}]\}^{1/2} = [T] = \text{LHS. Proved.}$
