MORE QUESTIONS SOLVED

I. Very Short Answer Type Questions
Question 1. What are derived units?
Answer: Units of those physical quantities which are derived from the fundamental units are called derived units.

Question 2. What do you understand by fundamental physical quantities?
Answer: Fundamental physical quantities are those quantities which are independent of each other. For example, mass, length, time, temperature, electric current, luminous intensity and amount of substance are seven fundamental physical quantities.

Question 3. Define parsec.
Answer: The distance at which a star would have annual parallax of 1 second of arc.
1 parsec = 3.08×10^{16} m

Question 4. Define Atomic mass unit (a.m.u.).
Answer: 1 a.m.u. = 1/12 th mass of carbon-12 atom, i.e., 1.66×10^{-27} kg.

Question 5. Which is a bigger unit-light year or parsec?
Answer: Parsec is bigger unit than light year (1 parsec = 3.26 light year).

Question 6. Do A and A.U. stand for same length?
Answer: No, 1 A = 10^{-10} m
1 A.U. = 1.496×10^{11} m

Question 7. Name two pairs of physical quantities whose dimensions are same.
Answer:

1. Stress and Young's modulus.
2. Work and Energy.

Question 8. What is the order of precision of an atomic clock?
Answer: About 1 in 10^{12} to 10^{13} s.

Question 9. What does RADAR stand for?
Answer: RADAR stands for 'Radio detection and ranging'.

Question 10. What does SONAR stand for?
Answer: SONAR stands for 'sound navigation and ranging'.

Question 11. $f = x^2$, then what is the relative error in f?
Answer: $2\Delta x/x$

Question 12. Name at least six physical quantities whose dimensions are $ML^2 T^{-2}$.
Answer:

1. Work
2. Torque
3. Moment of force
4. Couple

5. Potential energy
6. Kinetic energy.

Question 13. Name four units used in the measurement of extremely short distances.
Answer:

- 1 micron (1 p) = 10^{-6} m
- 1 nano metre (1 nm) = 10^{-9} m
- 1 angstrom (1 A) = 10^{-10} m
- 1 fermi (1 f) = 10^{-15} m.

Question 14. If $x = a + bt + ct^2$ where x is in metre and t in second, then what is the unit of e?
Answer: According to the principle of homogeneity of dimensions.
$[ct^2] = [L]$ or $[c] = [LT^{-2}]$
So, the unit of c is ms^{-2}.

Question 15. Do all physical quantities have dimensions? If no, name four physical quantities which are dimensionless.
Answer: No, all physical quantities do not possess dimensions.
Angle, specific gravity, Poisson's ratio and Strain are four examples of dimensionless quantities.

Question 16. Obtain the dimensions of relative density.
Answer: As relative density is defined as the ratio of the density of given substance and the density of standard distance (water), it is a dimensionless quantity.

Question 17. Obtain the dimensional formula for coefficient of viscosity.
Answer:

$$\text{As} \quad F = \eta A \frac{dv}{dx}, \quad \text{hence} \quad \eta = \frac{F\,dx}{A\,dv}$$

$$\therefore \quad [\eta] = \frac{[F][dx]}{[A][dv]} = \frac{M\,L\,T^{-2} \cdot L}{L^2 \cdot L\,T^{-1}} = [M^1\ L^{-1}\ T^{-1}]$$

Question 18. Do specific heat and latent heat have the same dimensions?
Answer: No.

Question 19. Do mass and weight have the same dimensions?
Answer: No.

Question 20. Given that the value of G in the CGS system as 6.67 x 10^{-8}dyne cm^2 g^{-2} , find the value in MKS system.
Answer:
6.67 x 10^{-8} dyne cm^2 g^{-2}
= 6.67 x 10^{11} Nm^2 /kg^2 .

********** END **********