

RACE # 01	UNIT AND DIMENSIONAL ANALYSIS	PHYSICS
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- For $10^{(at+3)}$, the dimension of a is-
 (A) $M^0 L^0 T^0$ (B) $M^0 L^0 T^1$ (C) $M^0 L^0 T^{-1}$ (D) None of these
- Which of the following pairs of physical quantities has different dimensions ?
 (A) stress, pressure (B) Young's modulus, energy density
 (C) density, relative density (D) energy, torque
- Which one of the following is not a unit of time ?
 (A) lunar month (B) leap year (C) parallax second (D) solar day
- Two quantities whose dimensions are not same, cannot be-
 (A) multiplied with each other (B) divided
 (C) added or subtracted in the same expression (D) added together
- If the units of length and force are increased four times, then the unit of energy will-
 (A) becomes 8 times (B) becomes 16 times (C) decrease 16 times (D) increase 4 times
- If the units of length, velocity and force are half, then the units of Power will be –
 (A) doubled (B) halved (C) one fourth (D) remain unaffected
- Choose the wrong statement-
 (A) all quantities can be expressed dimensionally in terms of the fundamental quantities
 (B) a fundamental quantity cannot be represented dimensionally in terms of the rest of fundamental quantities
 (C) the dimension of a fundamental quantity, in other fundamental quantities is always zero
 (D) the dimension of a derived quantity is never zero in any fundamental quantity
- If h is height and g is acceleration due to gravity, then the dimensional formula of $\sqrt{\frac{2h}{g}}$ is the same as that of -
 (A) time (B) mass (C) volume (D) velocity
- Which of the followings is not a derived physical quantity ?
 (A) Speed (B) Volume (C) Force (D) Mass
- Dimensional formula for the linear momentum is-
 (A) $[ML^0T^{-1}]$ (B) $[M^0LT^{-1}]$ (C) $[MLT^{-1}]$ (D) $[ML^{-1}T]$
- Which of the following is dimensionless ?
 (A) $\frac{v^2}{rg}$ (B) $\frac{v^2g}{r}$ (C) $\frac{vg}{r}$ (D) v^2rg
- Which of the following is not a fundamental physical quantity ?
 (A) Mass (B) Length (C) Temperature (D) Density
- Light year is the unit of
 (A) time (B) Speed (C) distance (D) None of these
- Dimensional formula for the pressure is
 (A) $[ML^{-1}T^{-2}]$ (B) $[MLT^{-2}]$ (C) $[ML^{-2}T]$ (D) $[M^{-1}L^{-1}T^{-2}]$
- Choose the wrong 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 may be incorrect

16. A unitless quantity -
 (A) may have a non zero dimension of any base quantity
 (B) always has a non zero dimension of all base quantities
 (C) never has a non-zero dimension of any base quantity
 (D) does not exist
17. The velocity v of a particles is given in terms of time t by the equation. $v = at + \frac{b}{t+c}$. 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
18. The equation of a wave is given by $y = A \sin \omega \left\{ \frac{x}{v} - k \right\}$; where ω is the angular velocity and v is the linear velocity. The dimensions of k is
 (A) LT (B) T (C) T^{-1} (D) T^2
19. The time dependence of a physical quantity p is given by $p = p_0 e^{(-\alpha t^2)}$ where α is constant and t is time. The constant α
 (A) is dimensionless (B) has dimensions T^{-2} (C) has dimensions T^2 (D) has dimensions of p
20. Given that $y = a \cos \left(\frac{t}{p} - qx \right)$ where t is time in second and x represent distance in metre. Which of the following is true ?
 (A) The unit of x is same as that of q (B) The unit of x is same as that of p
 (C) The unit of t is same as that of q (D) The unit of t is same as that of p
21. The dimensions of $\frac{a}{b}$ in the equation $P = \frac{a-t^2}{bx}$ where P is pressure, x is distance and t is time, are
 (A) $[M^2 L T^{-3}]$ (B) $[MT^{-2}]$ (C) $[LT^{-3}]$ (D) $[ML^3 T^{-1}]$
22. 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) $M^0 L^3 T^0$
23. What is the physical quantity whose dimensions are $M L^2 T^{-2}$ -
 (A) Pressure (B) Kinetic energy (C) Power (D) Momentum
24. What is the unit of k in the relation $U = \frac{ky}{y^2 + a^2}$, where U represents the potential energy, y represents the displacement and a represents the maximum displacement i.e., amplitude ?
 (A) ms^{-1} (B) ms (C) Jm (D) Js^{-1}
25. A wave is represented by $y = a \sin (At - Bx + C)$ where A , B , C are constants. The Dimensions of A , B , C are-
 (A) T^{-1} , L , $M^0 L^0 T^0$ (B) T^{-1} , L^{-1} , $M^0 L^0 T^0$ (C) T , L , M (D) T^{-1} , L^{-1} , M^{-1}

Answers

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1. (C) 2. (C) 3. (C) 4. (C) 5. (B) 6. (C) 7. (D) 8. (A) 9. (D) 10. (C)
11. (A) 12. (D) 13. (C) 14. (A) 15. (C) 16. (C) 17. (C) 18. (B) 19. (B) 20. (D)
21. (B) 22. (C) 23. (B) 24. (C) 25. (B)