

7. An alternative form of the unit of resistance, the ohm(Ω) is VA^{-1} . Which of the following examples shows a similar correct alternative form of unit?
- | unit | alternative form |
|----------------|------------------|
| A) coulomb (C) | As^{-1} |
| B) farad (F) | VC^{-1} |
| C) pascal (Pa) | Nm^{-2} |
| D) volt (V) | JC |
8. In the relation $y = r \sin(\omega t + kx)$, the dimensional formula for kx is same as
- | | |
|-------------------------|--------------------------|
| A) r/ω | B) r/y |
| C) $\frac{\omega t}{r}$ | C) $\frac{yr}{\omega t}$ |
9. If n is the numerical value of the physical quantity in the system in which its unit is u , then which of the following relations is correct?
- | | |
|----------------------------|----------------------------|
| A) $n/u = \text{constnat}$ | B) $u/n = \text{constant}$ |
| C) $nu = \text{constnt}$ | D) none of these |
10. Which of the following is not the name of a physical quantity?
- | | |
|-------------|------------|
| A) Kilogram | B) Impulse |
| C) Energy | D) Density |
11. Given that $r = m^2 \sin(\pi t)$. Where t represents time. If the unit of m is N, then the unit of r is
- | | |
|----------|-----------|
| A) N | B) Ns |
| C) N^2 | D) N^2s |

12. The equation of the stationary wave is

$$y = 2A \sin\left(\frac{2\pi ct}{\lambda}\right) \cos\left(\frac{2\pi x}{\lambda}\right)$$

Which of the following statements is correct?

- | |
|---|
| A) the unit of ct is same as that of λ |
| B) the unit of x is same as that of $\frac{2\pi x}{\lambda}$ |
| C) the unit of $\frac{2\pi c}{\lambda}$ is same as that of $\frac{2\pi x}{\lambda}$ |
| D) the unit of c/λ is same as that of x/λ |
13. The number of particles crossing the unit area perpendicular to the z -axis per unit time is given by

$$n = -D \frac{(n_2 - n_1)}{(z_2 - z_1)}$$

where n_2 and n_1 are the number of particles per unit volume at z_2 and z_1 respectively. What is the dimensional formula for D ?

- | | |
|----------------------|----------------------|
| A) $M^0L^{-1}T^{-2}$ | B) $M^0L^{-1}T^{-1}$ |
| C) $M^0L^2T^{-1}$ | D) $M^0L^2T^2$ |

Dimensional & Error Analysis

14. If energy E , velocity V and time T are taken as the fundamental units, the dimensional formula for surface tension is
 A) $E^1V^{-2}T^{-2}$ B) $E^{-2}V^1T^{-2}$
 C) $E^{-2}V^{-2}T^1$ D) $E^{-2}V^{-2}T^{-2}$
15. The density of wood is 0.5 g/cc in CGS system of units. The corresponding value in MKS units is
 A) 500 B) 0.5
 C) 5×10^{-2} D) 5000
16. A spherical body of mass m and radius r is allowed to fall in a medium of viscosity η . The time in which the velocity of the body increases from zero to 0.63 times the terminal velocity (v) is called time constant (τ). Dimensionally τ can be represented by
 A) $\frac{mr^2}{6\pi\eta}$ B) $\sqrt{\frac{6\pi\eta mr}{g^2}}$
 C) $\frac{m}{6\pi\eta rv}$ D) none of the above
17. The equation of state of some gases can be expressed as

$$\left(P + \frac{a}{V^2}\right)(V - b) = RT$$
 Here P is the pressure, V the volume and T is the absolute temperature and a , b , R are constants. The dimensions of a are
 A) $M^1L^5T^{-2}$ B) $M^1L^4T^{-2}$
 C) $M^0L^3T^0$ D) $M^0L^6T^0$
18. Plank's constant has the dimensions of
 A) energy
 B) linear momentum
 C) work
 D) angular momentum
19. Of the following quantities, which one has dimensions different from the remaining three
 A) Energy per unit volume
 B) Force per unit area
 C) Product of voltage and charge per unit volume
 D) Angular momentum per unit time
20. A screw-gauze has 250 equal divisions marked along the periphery of its disc and one full rotation of the disc advances on the main scale by 0.0625 cm. The least count of instrument is
 A) 2.5×10^{-2} cm B) 2.5×10^{-3} cm
 C) 2.5×10^{-4} cm D) 2.5×10^{-5} cm
21. Error in measurement of radius of a sphere is 1 %. Then error in the measurement of its volume is
 A) 1 % B) 5 %
 C) 3 % D) 8 %

22. If L denotes the inductance of an inductor through which a current I is flowing, the dimensions of LI^2 are
 A) inexpressible in MLT
 B) $M^1L^2T^{-2}$
 C) $M^1L^1T^{-2}$
 D) $M^2L^2T^2$
23. If V denotes the potential difference across the plates of a capacitor of capacitance C the dimensions of CV^2 are
 A) inexpressible in MLT
 B) $M^1L^1T^{-2}$
 C) $M^2L^1T^{-1}$
 D) $M^1L^2T^{-2}$
24. L , C and R represent physical quantities inductance, capacitance and resistance respectively. The combination, which have the dimensions of time are
 A) $\frac{1}{RC}$
 B) $\frac{1}{\sqrt{LC}}$
 C) $\frac{L}{R}$
 D) $\frac{C}{L}$
25. The dimensional formula for root mean square velocity is
 A) $M^0L^1T^{-1}$
 B) $M^0L^0T^{-2}$
 C) $M^0L^0T^{-1}$
 D) $M^1L^1T^{-3}$
26. Unit of the electric field strength is
 A) volt/coulomb
 B) newton/ampere
 C) dyne/ampere
 D) newton/coulomb
27. The dimensions of the quantities of one of the following pairs are the same. Identify the pair.
 A) Torque and work
 B) Angular momentum and work
 C) Energy and Young's modulus
 D) Light year and velocity of light
28. The dimensions of calorie are
 A) $M^1L^2T^{-2}$
 B) $M^0L^1T^{-2}$
 C) $M^1L^{-2}T^{-1}$
 D) $M^1L^2T^{-1}$
29. The dimensional formula for bulk modulus of elasticity is
 A) $M^1L^{-2}T^{-2}$
 B) $M^1L^{-3}T^{-2}$
 C) $M^1L^{-2}T^{-3}$
 D) $M^1L^{-1}T^{-2}$
30. Stefan's constant has the unit
 A) joule s^{-1} meter $^{-2}$ K 4
 B) kg s^{-3} K 4
 C) watt meter $^{-2}$ K $^{-4}$
 D) Newton meter s^{-1} K $^{-4}$
31. Which of the following is true, given $[q] = [ML^{-1}T^{-1}]$. Here v , A and t represent velocity, area and time respectively
 A) $q = A \frac{dv}{dt}$
 B) $q = A \frac{dt}{dv}$
 C) $q = \frac{1}{A} \frac{dv}{dt}$
 D) none of these
32. Dimensional formula for the gravitational constant is
 A) $M^1L^{-2}T^{-2}$
 B) $M^{-1}L^3T^{-2}$
 C) $M^1L^1T^{-2}$
 D) $M^1L^3T^2$

Dimensional & Error Analysis

- 33.** The SI unit of universal gas constant (R) is
 A) $\text{W K}^{-1} \text{mol}^{-1}$ B) $\text{N K}^{-1} \text{mol}^{-1}$
 C) $\text{J K}^{-1} \text{mol}^{-1}$ D) $\text{erg K}^{-1} \text{mol}^{-1}$
- 34.** One poise is equal to
 A) 0.01 N-s m^{-2} B) 0.1 N-s m^{-2}
 C) 1 N-s m^{-2} D) 10 N-s m^{-2}
- 35.** A suitable unit for gravitational constant is
 A) kg m s^{-1} B) $\text{N K}^{-1} \text{mol}^{-1}$
 C) $\text{N m}^2 \text{kg}^{-2}$ D) kg m s^{-2}
- 36.** The dimensional formula of moment of couple
 A) $\text{M}^1\text{L}^2\text{T}^{-2}$ B) $\text{M}^1\text{L}^1\text{T}^{-2}$
 C) $\text{M}^1\text{L}^{-1}\text{T}^{-3}$ D) $\text{M}^1\text{L}^{-2}\text{T}^2$
- 37.** The dimensional formula for impulse is
 A) $\text{M}^1\text{L}^1\text{T}^{-2}$ B) $\text{M}^1\text{L}^1\text{T}^{-1}$
 C) $\text{M}^1\text{L}^2\text{T}^{-1}$ D) $\text{M}^2\text{L}^1\text{T}^{-1}$
- 38.** The dimensional formula for plank's constant (h) is
 A) $\text{M}^1\text{L}^{-2}\text{T}^{-3}$ B) $\text{M}^1\text{L}^2\text{T}^{-2}$
 C) $\text{M}^1\text{L}^2\text{T}^{-1}$ D) $\text{M}^1\text{L}^{-2}\text{T}^{-2}$
- 39.** From the equation $\tan \theta = \frac{v^2}{rg}$, one can obtain the angle of banking for a cyclist taking a curve. The symbols have their usual meaning. Then say it is
 A) both dimensionally and numerically correct
 B) neither numerically nor dimensionally correct
 C) dimensionally correct only
 D) numerically correct only
- 40.** Which of the following is dimensionally correct?
 A) pressure = energy per unit area
 B) pressure = energy per unit volume
 C) pressure = force per unit volume
 D) pressure = momentum per unit volume per unit time
- 41.** A dimensionally consistent relation for the volume V of a liquid of co-efficient of viscosity flowing per second through a tube of radius r and length l and having a pressure difference p across its ends is
 A) $V = \frac{\pi p r^4}{8 \eta l}$ B) $V = \frac{\pi \eta}{8 p r^4}$
 C) $V = \frac{8 p \eta}{\pi r^4}$ D) $V = \frac{\pi p \eta}{8 r^{-4}}$
- 42.** E , m , J and G denote energy, mass, angular momentum and gravitational constant respectively. The dimensions of $\frac{EJ^2}{m^5 G^2}$ are the same as of
 A) angle B) length
 C) mass D) time

43. Which one of the following has not been expressed in proper units?
 A) Coefficient of elasticity = N m^{-2} B) Surface tension = Nm^{-1}
 C) Energy = kg m s^{-1} D) Pressure = N m^{-2}
44. If a physical quantity is represented by $X = M^a L^b T^{-c}$. If percentage errors in the measurement of M, L and T are $\alpha\%$, $\beta\%$ and $\gamma\%$ respectively then total percentage error is
 A) $(\alpha a - \beta b + \gamma c)\%$ B) $(\alpha a + \beta b + \gamma c)\%$
 C) $(\alpha a - \beta b - \gamma c)\%$ D) none of these
45. A pressure of 10^6 dynes/cm² is equivalent to
 A) 10^3 N m^{-2} B) 10^6 N m^{-2}
 C) 10^5 N m^{-2} D) 10^8 N m^{-2}
46. If the value of r is 10.845Ω and the value of current is 3.23 A , the potential is 35.02935 V , its value in significant numbers would be
 A) 35 V B) 35.0 V
 C) 35.029 V D) 35.03 V
47. The least count of a stopwatch is $\frac{1}{5}$ second. The time of 20 oscillations of a pendulum is measured to be 25 seconds. The minimum percentage error in the measurement of time will be
 A) 0.1% B) 0.8%
 C) 1.8% D) 8%
48. The dimensions of $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$ represents
 A) force B) velocity
 C) acceleration D) momentum
49. L , C and R represent the physical quantities inductance, capacitance and resistance respectively. Which of the following combinations has the dimensions of frequency
 A) $\frac{1}{RC}$ B) $\frac{1}{\sqrt{L/C}}$
 C) $\frac{R}{L}$ D) $\frac{C}{L}$
50. The dimensions of heat have
 A) +1 in length B) -1 in length
 C) -2 in length D) -2 in time

Answer To Unit, Dimension & Error Analysis

01. D)	02. D)	03. B)	04. A)	05. B)	06. B)	07. C)	08. B)	09. C)	10. A)
11. C)	12. A)	13. C)	14. A)	15. A)	16. D)	17. A)	18. D)	19. D)	20. C)
21. C)	22. B)	23. D)	24. C)	25. A)	26. D)	27. A)	28. A)	29. D)	30. C)
31. D)	32. B)	33. C)	34. B)	35. C)	36. A)	37. B)	38. C)	39. A)	40. B)
41. A)	42. A)	43. C)	44. B)	45. C)	46. B)	47. B)	48. B)	49. A)	50. D)