1. μ_0 and ε_0 denote the permeability and permittivity of free space, the dimensions of $\mu_0\varepsilon_0$ are
   a) LT^{-1} b) $L^{-2}T^2$ c) $M^{-1}L^{-3}Q^2T^2$ d) $M^{-1}L^{-3}I^2T^2$
2. If P represents radiation pressure, c represents speed of light and Q represents radiation energy striking a unit area per second, then non-zero integers x, y and z such that $P^xQ^yc^z$ is dimensionless, are –
   a) x = 1, y = 1, z = –1 b) x = 1, y = –1, z = 1
   c) x = –1, y = 1, z = 1 d) x = 1, y = 1, z = 1
3. If velocity v, acceleration A and force F are chosen as fundamental quantities, then the dimensional formula of angular momentum in terms of v, A and F would be
   a) $FA^{-1}v$ b) Fv^3A^{-2} c) Fv^2A^{-1} d) $F^2v^2A^{-1}$
4. If the time period (T) of vibration of a liquid drop depends on surface tension (S), radius (R) of the drop and density (ρ) of the liquid, then the expression of T is –
   a) $T = k\sqrt{\rho r^3 / S}$ b) $T = k\sqrt{\rho^{1/2} r^3 / S}$ c) $T = k\sqrt{\rho r^3 / S^{1/2}}$ d) None of these
5. If pressure P, velocity V and time T are taken as fundamental physical quantities, the dimensional formula of force is
   a) PV^2T^2 b) $P^{-1}V^2T^{-2}$ c) PVT^2 d) $P^{-1}VT^2$
6. If energy (E), velocity (V) and force (F) be taken as fundamental quantity, then what are the dimensions of mass
   a) Ev^2 b) Ev^{-2} c) Fv^{-1} d) Fv^{-2}
7. A physical quantity x depends on quantities y and z as follows : x = Ay + B tan Cz, where A, B and C are constants. Which of the following do not have the same dimensions
   a) x and B b) C and z^{-1} c) y and B/A d) x and A
8. The dimensional formula $M^0L^2T^{-2}$ stands for
   a) Torque b) Angular momentum
   c) Latent heat d) Coefficient of thermal conductivity
9. In a system of units of force (F), acceleration (A) and time (T) are taken as fundamental units then the dimensional formula of energy is –
   a) FA^2T b) FAT^2 c) F^2AT d) FAT
10. If c is charge. V is potential difference, T is temperature, then units of $\frac{cV}{T}$ are same as of –
    a) Planck's constant b) Stefan's constant
    c) Boltzman constant d) Gravitational constant
11. For a body moving along x-axis, the distance travelled by body from a reference point is given as function of time t as x = at2 + b, where a and b are constants, then the dimensions of $\sqrt{ab}$ is same as –

a) Speed b) Distance travelled c) Acceleration d) None of these

12. Let $y = \ell^2 - \frac{\ell^3}{z}$ where $\ell = 2.0 \pm 0.1$, $z = 1.0 \pm 0.1$ then the value of y is given by –
a) $+ 2 \pm 0.8$ b) $- 4 \pm 1.6$ c) $- 4 \pm 0.8$ d) None of these
13. Each side of n cube is measured to be 7,203 m. What is the total volume of the cube to appropriate significant figures –
a) 3.37.7 m^3 b) 311.3 m^3 c) 2.113 m^3 d) 3737 m^3
14. Find the value of $\frac{1.53 \times 0.9995}{1.592}$ with due regard for significant figures
a) 0.961 b) 0.123 c) 0.921 d) 0.913
15. The values of kinetic energy K and potential energy U are measured as follows :
$K = 100.0 \pm 2.0$ J, $U = 200.0 \pm 1.0$ J. Then the percentage error in the measurement of mechanical energy is –
a) 2.5% b) 1% c) 0.5% d) 1.5%
16. The initial and final temperatures of a liquid in a container are observed to be 76.3 ± 0.4 °C and 67.7 ± 0.3 °C. Find the fall in the temperature of the liquid.
a) 8.6 ± 0.1 °C b) 8.6 ± 0.7 °C c) $1.6 \pm o.1$ °C d) 8.6 ± 1.1 °C
17. The heat generated in a circuit is given by $H = I^2Rt$ joule where I is current. R is resistance and t is time. If the percentage errors in measuring I, R and t are 2%, 1% and 1% respectively. The maximum error in measuring heat will be –
a) 2% b) 3% c) 4% d) 6%
18. The frequency (f) of a wire oscillating with a length ℓ, in p loops, under a tension T is given by $f = \frac{p}{2\ell}\sqrt{\frac{T}{\mu}}$ where μ = linear density of the wire. It the error made in determining length, tension and linear density be 1%, –2% and 4%, then find the percentage error in the calculated frequency.
a) –4% b) –2% c) –1% d) –5%
19. The density of a sphere is measured by measuring its mass and diameter. If, it is known that the maximum percentage errors in the measurement are 2% and 3%, then find the maximum percentage error in the measurement of density?
a) 15% b) 18% c) 9% d) 11%
20. The pairs having same dimensional formula –
a) Angular momentum, torque
b) Torque, work
c) Planck's constant, boltzman's constant
d) Gas constant, pressure
21. The physical quantities not having same dimensions are –

a) Momentum and Planck's constant b) Stress and Young's modulus

c) Speed and $(\mu_0\varepsilon_0)^{-1/2}$ d) Torque and work

22. Dimensions of $\frac{1}{\mu_o\varepsilon_o}$, where symbols have their usual meaning, are

a) $[L^2T^2]$ b) $[L^2T^{-2}]$ c) $[LT^{-1}]$ d) $[L^{-1}T]$

23. Which one of the following represents the correct dimensions of the coefficient of viscosity

a) $ML^{-1}T^2$ b) MLT^{-1} c) $ML^{-1}T^{-1}$ d) $ML^{-2}T^{-2}$

24. Out of the following pair, which one does NOT have identical dimensions is

a) Angular momentum and Planck's constant b) impulse and momentum

c) Moment of inertia and moment of a force d)work and torque

25. Which of the following units denotes the dimensions ML^2/Q^2, where Q denotes the electric charge –

a) H/m^2 b) Weber (Wb) c) Wb/m^2 d) Henry (H)