1. The dimensions of time constant $\frac{L}{R}$ during growth and decay of current in an inductive circuit are same as those of
   a) constant b) resistance c) current d) time
2. If the speed of light (c) acceleration due to gravity (g) and pressure (p) are taken as the fundamental quantities, then the dimensions of length will be
   a) $c^2 g^{-1} p^0$ b) $cg^0 p^{-1}$ c) $c^{-1} gp^0$ d) $cg^{-1} p^0$
3. If $x = \frac{a}{b}$ and Δa and Δb are the errors in the measurement of a and b, respectively, then the maximum percentage error in the value of x will be
   a) $\left(\frac{\Delta a}{\Delta a} + \frac{\Delta b}{b}\right)$ x 100 b) $\left(\frac{\Delta a}{a} - \frac{\Delta b}{b}\right)$ x 100
   c) $\left(\frac{\Delta a}{a-b} + \frac{\Delta b}{a-b}\right)$ x 100 d) $\left(\frac{\Delta a}{a-b} - \frac{\Delta b}{a-b}\right)$ x 100
4. If the orbital velocity of a planet is given by $\upsilon = G^a M^b R^c$, then
   a) $a = \frac{1}{3}, b = \frac{1}{3}, c = -\frac{1}{3}$ b) $a = \frac{1}{2}, b = \frac{1}{2}, c = -\frac{1}{2}$
   c) $a = \frac{1}{2}, b = -\frac{1}{2}, c = \frac{1}{2}$ d) $a = \frac{1}{2}, b = -\frac{1}{2}, c = -\frac{1}{2}$
5. In an experiment to determine acceleration due to gravity by simple pendulum, a student commits 1% positive error in the measurement of length and 3% negative error in the measurement of time period. The percentage error in the value of g will be
   a) 7% b) 10% c) 4% d) 3%
6. The best method to reduce random errors is
   a) To change the instrument used for measurement
   b) To take help of experienced observer
   c) To repeat the experiment many times and to take the average results
   d) None of these
7. The least count of an instrument is 0.01 cm. Taking all precautions the most possible error in the measurement can be
   a) 0.005 cm b) 0.001 cm c) 0.01 cm d) 0.02 cm
8. The fundamental frequency of vibration of a stretched string is given by $v = \frac{1}{2l}\sqrt{\frac{T}{m}}$, where the symbols have their usual meanings. The dimensions of m are
   a) $ML^{-1}T^0$ b) ML^0T^0 c) $ML^{-1}T$ d0 $M^{-1}LT^0$
9. Which of the following pairs has the same dimensions?
   a) Pressure and density b) Impulse and momentum

c) Stress and strain d) Momentum and inertia

10. The dimensions of PV are equivalent to those of
    a) work b) force c) pressure d) volume
11. If ρ is the mean density of the earth, r its radius, g the acceleration due to gravity and G the gravitational constant, on the basis of dimensional consistency, the correct expression is
    a) $\rho = \frac{3G}{4\pi rg}$ b) $\rho = \frac{rG}{12\pi g}$ c) $\rho = \frac{3g}{4\pi rG}$ d) $\rho = \frac{3r}{4\pi gG}$
12. The dimension of $\left(\frac{1}{2}\right)\varepsilon_0 E^2$ (ε_0 : permittivity of free space : E : electric field) is
    a) MLT^{-1} b) $ML^{-1}T^{-2}$ c) MLT^{-2} d) ML^2T^{-1}
13. 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 mass
14. The time dependence of a physical quantity P is given by P = P0 exp (αt2) where α is a constant and t is time. The constant α
    a) is dimensionless
    b) Has dimensions of T^{-2}
    c) Has dimensions as that of P
    d) Has dimensions equal to the dimensions of PT^{-2}
15. The dimensional formula of magnetic moment is
    a) M^{-2} A b) M^2A c) L^2A d) $L^{-2}A$
16. If energy E, velocity V and time T are taken as the fundamental units, the dimensional formula for surface tension is
    a) $EV^{-2}T^{-2}$ b) $E^{-2}VT^{-2}$ c) $E^{-2}V^{-2}T$ d) $E^{-2}V^{-2}T^{-2}$
17. In the formula $X = 3YZ^2$, X and Z have dimensions of capacitance and magnetic induction respectively. What are the dimensions of Y in MKSQ system?
    a) $M^{-3}L^{-1}T^3Q^4$ b) $M^{-3}L^{-2}T^4Q^4$ c) $M^{-2}L^{-2}T^4Q^4$
    d) $M^{-3}L^{-2}T^4Q^1$
18. E, m, L, G denote energy, mass, angular momentum and gravitational constant respectively. The dimensions of $\frac{EL^2}{m^5G^2}$ will be that of
    a) Angle b) length c) mass d) time
19. Out of the following expressions for the couple per unit twist, time period of a compound pendulum, frequency of a stretched wire and time period of a simple pendulum respectively, the

dimensionally in consistent one is where η is coefficient of rigidity, r is the radius of the wire, K is the radius of gyration and is ρ mass per unit length and l is the length corresponding to the particular case.

a) $C = \frac{\eta\pi r^4}{2l}$ b) $T = 2\pi$ c) $f = \frac{1}{l}\sqrt{\frac{T}{\rho}}$ d) $T = 2\pi\sqrt{\frac{l}{g}}$

20. In the radioactive decay law $N = N_0e^{-\lambda t}$, the dimensions of λ are
a) $M^0L^0T^0$ b) $M^0L^0T^{-1}$ c) M^0L^0T d) ML^0T^{-1}

21. Planck's constant has the dimensions of
a) Force b) energy
c) linear momentum d) angular momentum

22. The SI unit of mobility of charges (μ) is
a) $Cskg^{-1}$ b) $CKgs^{-1}$ c) Cskg d) $Cs^{-1}kg^{-1}$

23. Turpentine oil is flowing through a tube of length l and radius r. The pressure difference between the two ends of the tube is ρ; the viscosity of the oil is given by $\eta = \frac{p(r^2 - x^2)}{4\upsilon l}$ where υ is the velocity of oil at a distance x from the axis of the tube. From this relation, the dimensions of viscosity η are
a) $M^0L^0T^0$ b) MLT^{-1} c) ML^2T^{-2} d) $ML^{-1}T^{-1}$

24. The SI unit of is equivalent to that of
a) time period b) frequency c) wave length
d) wave number

25. Given that $\tan\theta = \frac{\upsilon^2}{rg}$ gives the angle of banking of the cyclist going round the curve. Here υ is the speed of cyclist, r is the radius of the curve and g is acceleration due to gravity. Which of the following statements about the relation is true?
a) It is both dimensionally as well as numerically correct.
b) It is neither dimensionally correct nor numerically correct.
c) It is dimensionally correct but not numerically.
d) It is numerically correct but not dimensionally.