SUBJECT- PHYSICS

Unit & Dimension (DPP-1)

Objective questions:-

1. The quantities A and B are related by the relation, m=A/B, where m is the linear density and A is the force. The dimensions of B are of
   A. Latent heat **B.** Pressure **C.** Work **D.** None of the above
2. Force F and density d are related as $F=\alpha\beta+\sqrt{d}$ then find the dimension of α and β.
   A. $[L^{1/2}M^{3/2}T^{2}]$ B. $[L^{-1/2}M^{1/2}T^{-2}]$
   C. $[L^{-1}M^{3/2}T^{-2}]$ D. $[L^{-1}M^{1/2}T^{-2}]$
3. Given that m = mass, l = length, t = time and i = current. The dimensions of ml^2/t^3i are the same as that of:
   A. electric field B. electric potential C. capacitance D. inductance
4. Write the dimensions of a and b in the relation: $P=b-x^2/at$
   Where P is power, x is distance and t is time.
   A. $[M^0L^2T^0]$, $[M^{-1}L^0T^2]$ B. $[M^0L^2T^0]$, $[M^{-1}L^1T^2]$
   C. $[M^{-1}L^1T^2]$, $[M^0L^2T^0]$ D. $[M^{-1}L^0T^2]$, $[M^0L^2T^0]$
5. $\alpha=F/v^2\sin(\beta t)$ (here v = velocity, F = force, t = time)
   Find the dimension of α and β
   A. $[M^0L^2T^0]$, $[M^{-1}L^0T^2]$
   B. $[M^0L^2T^0]$, $[M^{-1}L^1T^2]$
   C. $[M^{-1}L^1T^2]$, $[M^0L^2T^0]$
   D. $[M^{-1}L^0T^2]$, $[M^0L^2T^0]$
6. The time dependence of a physical quantity P is given by $P=P_0e^{-\alpha t^2}$, where α is a constant and t is time. Then constant α is / has
   A. Dimensionless B. Dimensions of T^{-2} C. Dimensions of P D. Dimensions of T^2
7. The velocity v of a particle at time t is given by $v=at+b/(t+c)$ where a, b and c are constants. The dimensions of a, b and c are respectively:
   A. L^2, T and LT^2 B. LT^{-2}, L and T C. LT^2, L T and L D. L, LT and T^2
8. The equation of wave is given by $Y= A\sin\omega(x/v-k)$ where ω is the angular velocity and v is the linear velocity. The dimensions of k is:
   A. [L T] B. [T] C. $[T^{-1}]$ D. $[T^{-2}]$

9. A force is given by $F=at+bt^2$, where t is time, the dimensions of a and b are respectively:
   A. $[MLT^{-3}]$ and $[MLT^{0}]$ B. $[MLT^{-4}]$ and $[MLT^{-1}]$
   C. $[MLT^{-1}]$ and $[MLT^{0}]$ D. $[MLT^{-3}]$ and $[MLT^{-4}]$

10. If A, B and C are three physical quantities such that A and B are of same dimensions while C has different dimensions, then which of the following may be meaningful
   A. (A+C)/B B. (C-2B)/A C. A/(B+C) D. (2A-3B)/C

11. If frequency F, velocity V, and density D are considered fundamental units, the dimensional formula for momentum will be
   A. DVF^2 B. DV^2F^{-1} C. $D^2V^2F^2$ D. DV^4F^{-3}
12. The dimensional formula of product and quotient of two physical quantities A and B are given by $[AB] = ML^2T^{-2}$ & $A/B= MT^{-2}$, The quantities A and B respectively are
   A. Force and velocity B. Force and displacement
   C. Momentum and displacement D. Work and velocity
13. If C the velocity of light, h Planck's constant and G Gravitational constant are taken as fundamental quantities, then the dimensional formula of mass is:
   A. $h^{-1/2}G^{-1/2}C^{0}$ B. $h^{1/2}C^{1/2}G^{-1/2}$ C. $h^{-1/2}C^{1/2}G^{-1/2}$ D. $h^{-1/2}C^{-1/2}G^{-1/2}$
14. The centripetal force F acting on a particle moving uniformly in a circle may depend upon mass (m), velocity (v) and radius (r) of the circle. Derive the formula for F using the method of dimensions.
   A. $F=mv^2/2r^3$ (where k=1) B. $F=mv^2/r$ (where k=1)
   C. $F=mv^3/r^2$ (where k=1) D. $F=m^2v^2/2r$ (where k=1)
15. The volume V of water passing through a point of a uniform tube during t seconds is related to the cross-sectional area A of the tube and velocity u of water by the relation $V\propto A^{\alpha}u^{\beta}t^{\gamma}$. Which one of the following will be true?
   A. $\alpha=\beta\neq\gamma$ B. $\alpha\neq\beta\neq\gamma$ C. $\alpha=\beta=\gamma$ D. $a\neq\beta=\gamma$
16. Assertion: The number of significant figures depends on the least count of measuring instrument.
   Reason: Significant figures define the accuracy of measuring instrument.

   A. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion
   B. Both Assertion and Reason are correct but Reason is not the correct explanation for Assertion
   C. Assertion is correct but Reason is incorrect
   D. Assertion is incorrect but Reason is correct
17. If $K=d^4x/dt^4$ find dimensional formula of K :-
   A. $[L^4T^{-3}]$ B. $[L^4T^{-4}]$ C. $[LT^{-4}]$ D. $[LT^4]$

18. If E, m, l and G denote energy, mass, angular momentum and gravitational constant respectively, then the quantity (El^2/m^5G^2) has the dimensions of then
A. mass B. length C. time D. angle.

19. If velocity of light c, Planck's constant h and gravitational constant G are taken as fundamental quantities then the dimensions of length will be:
A. $\sqrt{ch/G}$ B. $\sqrt{hc^3/G}$ C. $\sqrt{hG/c^3}$ D. $\sqrt{hG/c^5}$

20. If force F, acceleration A and time T are taken as fundamental quantities then the dimensions of energy are :
A. A^2T B. F^2T C. $FA^{-1}T^{-1}$ D. FAT^2

21. If E and G respectively denote energy and gravitational constant, then E/G has the dimensions of:
A. $[M^2][L^{-1}][T^0]$ B. $[M][L^{-1}][T^{-1}]$ C. $[M][L^0][T^0]$ D. $[M^2][L^{-2}][T^{-1}]$

22. If energy (E), velocity (V) and time (T) are chosen as the fundamental quantities, the dimensional formula of surface tension will be
A. $[E^{-2}V^{-2}T^{-3}]$ B. $[EV^{-2}T^{-1}]$ C. $[EV^{-2}T^{-2}]$ D. $[EV^{-1}T^{-2}]$