CLASS : XITH
SUBJECT : Physics
DPP NO. : 1

Topic :- UNITS AND MEASUREMENTS

1. In an experiment, to measure the height of a bridge by dropping stone into water underneath, if the error in measurement of time is $0.1s$ at the end of $2s$, then the error in estimation of height of bridge will be
   a) $0.49\ m$ b) $0.98\ m$
   c) $1.96\ m$ d) $2.12\ m$

2. The dimension of k in the equation $W = \frac{1}{2}kx^2$ is
   a) $[ML^0T^{-2}]$ b) $[M^0LT^{-1}]$
   c) $[MLT^{-2}]$ d) $[ML^0T^{-1}]$

3. A body of mass $m = 3.513\ kg$ is moving along the x −axis with a speed of $5.00\ ms^{-1}$. The magnitude of its momentum is recorded as
   a) $17.6\ kg\ ms^{-1}$ b) $17.565\ kg\ ms^{-1}$ c) $17.56\ kg\ ms^{-1}$ d) $17.57\ kg\ ms^{-1}$

4. The dimensional formula for the modulus of rigidity is
   a) ML^2T^{-2} b) $ML^{-1}T^{-3}$
   c) $ML^{-2}T^{-2}$ d) $ML^{-1}T^{-2}$

5. The unit of physical quantity obtained by the line intergral of electric field is
   a) NC^{-1} b) Vm^{-1}
   c) JC^{-1} d) $C^2N^{-1}m^{-2}$

6. The dimensions of gravitational constant G and the moment of inertia are respectively
   a) $[ML^3T^{-2}]; [ML^2T^0]$
   b) $[M^{-1}L^3T^{-2}]; [ML^2T^0]$
   c) $[M^{-1}L^3T^{-2}]; [M^{-1}L^2T]$
   d) $[ML^3T^{-2}]; [M^{-1}L^2T]$

7. Unit of stress is
   a) N/m b) $N -$
   m c) N/m^2 d) $N - m^2$

8. Crane is British unit of volume (one crane = 170.4742). convert crane into SI units.
   a) 0.170474
   m^3 b) $17.0474m^3$ c) $0.00170474m^3$
   d) $1704.74m^3$

9. SI unit of intensity of wave is
   a) $Jm^{-2}s^{-1}$ b) $Jm^{-1}s^{-2}$
   c) $W\,m^{-2}$ d) $J\,m^{-2}$

10. If F denotes force and t time, then in equation $F = at^{-1} + bt^2$, the dimensions of a and b respectively are
    a) $[LT^{-4}]\ and\ [LT^{-1}]$
    b) $[LT^{-1}]\ and\ [LT^{-4}]$
    c) $[MLT^{-4}]\ and\ [MLT^{-1}]$
    d) $[MLT^{-1}]\ and\ [MLT^{-4}]$

11. If the constant of gravitation (G), Plank's constant (h) and the velocity of light (c) be chosen as fundamental units. The dimension of the radius of gyration is
a) $[1/2]c^{-3/2}G^{1/2}$ b) $[1/2]c^{3/2}G^{1/2}$
c) $[1/2]c^{-3/2}G^{-1/2}$ d) $[-1/2]c^{-3/2}G^{1/2}$

12. The mass and volume of a body are found to be $500 \pm 0.05\ kg$ and $1.00 \pm 0.05m^3$ respectively. Then the maximum possible percentage error in its density is
a) 6% b) 3%
c) 10% d) 5%

13. The unit of Stefan's constant σ is
a) $W\ m^{-2}\ K^{-1}$ b) $W\ m^2\ K^{-4}$
c) $W\ m^{-2}\ K^{-4}$ d) $W\ m^{-2}\ K^4$

14. In the equation $y = a \sin(\omega t + kx,)$ the dimensional formula of ω is
a) $[M^0L^0T^{-1}]$ b) $[M^0LT^{-1}]$
c) $[ML^0T^0]$ d) $[M^0L^{-1}T^0]$

15. The following observations were take for determining surface tension of water by capillary tube method. Diameter of capillary, $D = 1.25 \times 10^{-2}$ m and rise of water in capillary. $= 1.46 \times 10^{-2}$m Taking $g = 9.80ms^{-2}$ and using the relation $T = (rg/2) \times 103Nm^{-1}$, what is the possible error in surface tension$T$?
a) 2.4% b) 15%
c) 1.6% d) 0.15%

16. R and L represent respectively resistance and self inductance, which of the following combinations has the dimensions of frequency
a) $\frac{R}{L}$ b) $\frac{L}{R}$
c) $\sqrt{\frac{R}{L}}$ d) $\sqrt{\frac{L}{R}}$

17. The random error in the arithmetic mean of 100 observations is x; then random error in the arithmetic mean of 4000 observations would be
a) $4x$ b) $\frac{1}{4}x$
c) $2x$ d) $\frac{1}{2}x$

18. 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

19. $R, L\ and\ C$ represent the physical quantities resistance, inductance and capacitance respectively. Which one of the following combination has dimension of frequency?
a) $\frac{1}{\sqrt{RC}}$ b) $\frac{R}{L}$
c) $\frac{1}{LC}$ d) $\frac{C}{L}$

20. If the length of a rectangle $l = 10.5\ cm$, breadth $b = 2.1\ cm$ and minimum possible measurement by scale = 0.1 cm, then the area is
a) $22.0\ cm^2$ b) $22.1\ cm^2$
c) $22.05\ cm^2$ d) $22\ cm^2$