DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**
DATE : **DPP NO. : 3**

Topic :- UNITS AND MEASUREMENTS

1. The dimensions of $\frac{a}{b}$ in the equation $p = \frac{a - t^2}{bx}$ where p is pressure, x is distance and t is time, are
   a) $[M^2LT^{-3}]$ b) $[MT^{-2}]$ c) $[LT^{-3}]$ d) $[ML^3T^{-1}]$

2. The focal length of a mirror is given by $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ where u and v represent object and image `distances respectively. The maximum relative error in f is
   a) $\frac{\Delta f}{f} = \frac{\Delta u}{u} + \frac{\Delta v}{v}$ b) $\frac{\Delta f}{f} = \frac{1}{\Delta u/u} + \frac{1}{\Delta v/v}$
   c) $\frac{\Delta f}{f} = \frac{\Delta u}{u} + \frac{\Delta v}{v} - \frac{\Delta(u+v)}{u+v}$ d) $\frac{\Delta f}{f} = \frac{\Delta u}{u} + \frac{\Delta v}{v} + \frac{\Delta u}{u+v} + \frac{\Delta v}{u+v}$

3. Which of the following relation is wrong
   a) 1 ampere × 1 ohm = 1 volt b) 1 watt × 1 sec = 1 joule
   c) 1 × newton per coulomb = 1 volt per meter d) 1 coulomb × 1 volt = 1 watt

4. The unit of self inductance of a coil is
   a) $Farad$ b) $Henry$ c) $Weber$ d) $Tesla$

5. Out of the following four dimensional quantities, which one qualifies to be called a dimensional constant?
   a) Acceleration due to gravity b) Surface tension of water
   c) Weight of a standard kilogram mass d) The velocity of light in vacuum

6. The radius of the proton is about 10^{-15}m. The radius of the observable universe is 10^{26}m. identify the distance which is half-way between these two extremes on a logarithmic scale.
   a) 10^{21}m b) 10^{6}m c) 10^{-6}m d) 10^{0}m

7. The position of a particle at time t is given by the equation $x(t) = \frac{v_0}{A}(1 - e^{At})$, $v_0 =$ constant and $A > 0$. Dimensions of v_0 and A respectively are
   a) $[M^0LT^0]$ and $[M^0L^0T^{-1}]$ b) $[M^0LT^{-1}]$ and $[M^0LT^{-2}]$
   c) $[M^0LT^{-1}]$ and $[M^0L^0T]$ d) $[M^0LT^{-1}]$ and $[M^0L^0T^{-1}]$

8. One nanometre is equal to
a) $10^9\ mm$ b) $10^{-6} cm$ c) $10^{-7} cm$ d) $10^{-9} cm$

9. $[ML^2T^{-3}A^{-2}]$ is the dimensional formula of
a) Electric resistance b) Capacity c) Electric potential d) Specific resistance

10. The dimensions of Planck's constant are
a) $[M^2L^2T^{-2}]$ b) $[MLT^{-2}]$ c) $[ML^2T^{-2}]$ d) $[ML^2T^{-1}]$

11. If the length of rod A is $3.25 \pm 0.01\ cm$ and that of B is $4.19 \pm 0.01\ cm$ then the rod B is longer than rod A by
a) $0.94 \pm 0.00\ cm$ b) $0.94 \pm 0.01\ cm$ c) $0.94 \pm 0.02\ cm$ d) $0.94 \pm 0.005\ cm$

12. The dimensions of $e^2/4\pi\varepsilon_0 hc$, where e, ε_0, h and c are electronic charge, electric permittivity, Planck's constant and velocity of light in vacuum respectively, are
a) $[M^0L^0T^0]$ b) $[ML^0T^0]$ c) $[M^0LT^0]$ d) $[M^0L^0T^1]$

13. The length, breadth and thickness of a block are given by $l = 12cm$, $b = 6\ cm$ and $t = 2.45cm$
The volume of block according to the idea of significant figures should be
a) $1 \times 10^2\ cm^3$ b) $2 \times 10^2\ cm^3$ c) $1.763 \times 10^2\ cm^3$ d) None of tehse

14. A physical quantity A is related to four observables a, b, c and d as follows

$$A = \frac{a^2b^3}{c\sqrt{d}}$$

The percentage errors of measurement in a, b,c and d are 1%, 3%, 2% and 2% respectively. What is the percentage error in the quantity A?
a) 12% b) 7% c) 5% d) 14%

15. Ampere-hour is the unit of
a) Quantity of charge b) Potential c) Energy d) Current

16. The dimensions of $1/2\ \varepsilon E^2$ are same as
a) Energy density (energy per unit volume) b) Energy
c) Power d) None of the above

17. The velocity of a particle (v) at an instant t is given by $v = at + bt^2$ the dimension of b is
a) L b) LT^{-1} c) $LT^{-}2$ d) LT^{-3}

18. Wavelength of ray of light is $0.00006\ m$. It is equal to
a) $6\ micron$ b) $60\ micron$ c) $600\ micron$ d) $0.6\ micron$

19. The unit of surface tension in SI system is

a) $Dyne/cm^2$ b) $Newton\ /m$ c) $Dyne/cm$ d) $Newton/m^2$

20. Dimensions of $\frac{1}{\mu_0 \epsilon_0}$, where symbols have their usual meaning, are

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