DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**
DATE : **DPP NO. : 2**

Topic :- UNITS AND MEASUREMENTS

1. When a wave traverses a medium, the displacement of a particle located at x at a time t is given by $y = a\sin(bt - cx)$, where a, b and c are constants of the wave. Which of the following is a quantity with dimensions
   a) $\frac{y}{a}$ b) bt c) cx d) $\frac{b}{c}$

2. Identify the pair whose dimensions are equal
   a) Torque and work b) Stress and energy c) Force and stress d) Force and work

3. The equation $\left(P + \frac{a}{V^2}\right).(V - b) =$ constant. The unit of a is
   a) $Dyne \times cm^5$ b) $Dyne \times cm^4$ c) $Dyne \times cm^3$ d) $Dyne \times cm^2$

4. If L,C and R represent inductance, capacitance and resistance respectively, then which of the following does not represent dimensions of frequency
   a) $\frac{1}{RC}$ b) $\frac{R}{L}$ c) $\frac{1}{\sqrt{LC}}$ d) $\frac{C}{L}$

5. If the units of mass, length and time are doubled, unit of angular momentum will be
   a) Doubled b) Tripled
   c) Quadrupled d) 8 times the original value

6. The length of a simple pendulum is about 100 cm known to an accuracy of 1 mm. Its period of oscillation is 2s determined by measuring the time for 100 oscillations using a clock of 0.1 s resolution. What is the accuracy in the determined value of g?
   a) 0.2% b) 0.5% c) 0.1% d) 2%

7. Temperature can be expressed as a derived quantity in terms of any of the following
   a) Length and mass b) Mass and time
   c) Length, mass and time d) None of these

8. A small steel ball of radius r is allowed to fall under gravity through a column of a viscous liquid of coefficient of viscosity η. After some time the velocity of the ball attains a constant value known as terminal velocity v_T. The terminal velocity depends on (i) the mass of the ball m, (ii) η , (iii) r and (iv) acceleration due to gravity g. Which of the following relations is dimensionally correct

a) $v_T \propto \frac{mg}{\eta r}$ b) $v_T \propto \frac{\eta r}{mg}$ c) $v_T \propto \eta r m g$ d) $v_T \propto \frac{mgr}{\eta}$

9. The measured mass and volume of a body are 23.42 g and 4.9 cm^3 respectively with possible error 0.01 g and 0.1 cm^3. The maximum error in density is nearly

a) 0.2% b) 2% c) 5% d) 10%

10. A physical quantity A is related to four observations a,b,c and d as follows, $= \frac{a^2 b^3}{c\sqrt{d}}$. The percentage error 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%

11. The unit of Wien's constant b is

a) $Wm^{-2}K^{-4}$ b) $m^{-1}K^{-1}$ c) Wm^2 d) MK

12. Young's modulus of a material has the same units as

a) Pressure b) Strain c) Compressibility d) Force

13. Which of the following physical quantities has neither dimensions nor unit?

a) Angle b) Luminous intensity
c) Coefficient of friction d) Current

14. In the relation $y = a\cos(\omega t \_ kx)$, the dimensional formula for k is

a) $[M^0L^{-1}T^{-1}]$ b) $[M^0LT^{-1}]$ c) $[M^0L^{-1}T^0]$ d) $[M^0LT]$

15. The dimensional formula for the magnetic field is

a) $[MT^{-2}A^{-1}]$ b) $[ML^2T^{-1}A^{-2}]$ c) $[MT^{-2}A^{-2}]$ d) $[MT^{-1}A^{-2}]$

16. $Dyne/cm^2$ is not a unit of

a) Pressure b) Stress c) Strain d) Young's modulus

17. One side of a cubical block is measured with the help of a vernier callipers of vernier constant 0.01 cm. This side comes out to be 1.23 cm. What is the percentage error in the measurement of area?

a) $\frac{1.23}{0.01} \times 100$ b) $\frac{0.01}{1.23} \times 100$ c) $2 \times \frac{0.01}{1.23} \times 100$ d) $3 \times \frac{0.01}{1.23} \times 100$

18. $Ampere$ - $hour$ is a unit of
    a) Quantity of electricity
    b) Strength of electric current
    c) Power
    d) Energy

19. The velocity v (in cm/sec) of a particle is given in terms of time t(in sec) by the relation $v = at + \frac{b}{t+c}$; the dimensions of a, b and c are
    a) $a = L^2, b = T, c = LT^2$
    b) $a = LT^2, b = LT, c = L$
    c) $a = LT^2, b = L, c = T$
    d) $a = L, b = LT, c = T^2$

20. The potential energy of a particle varies with distance x from a fixed origin as $U = \left(\frac{A\sqrt{X}}{x+B}\right)$; where A and B are constants. The dimensions of AB are
    a) $[ML^{5/2}T^{-2}]$
    b) $[ML^2T^{-2}]$
    c) $[M^{3/2}L^{3/2}T^{-2}]$
    d) $[ML^{7/2}T^{-2}]$