



# **Chapter 1 Unit and Measurements**

## **Assignment 3**

### **Class 11**

Prerna Edu

# PRERNA EDUCATION

## DPP

DAILY PRACTICE PROBLEMS

CLASS : XI<sup>TH</sup>

DATE :

SUBJECT : PHYSICS

DPP NO. : 3

### Topic :- UNITS AND MEASUREMENTS

- 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
  - $[M^2LT^{-3}]$
  - $[MT^{-2}]$
  - $[LT^{-3}]$
  - $[ML^3T^{-1}]$
- 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
  - $\frac{\Delta f}{f} = \frac{\Delta u}{u} + \frac{\Delta v}{v}$
  - $\frac{\Delta f}{f} = \frac{1}{\Delta u/u} + \frac{1}{\Delta v/v}$
  - $\frac{\Delta f}{f} = \frac{\Delta u}{u} + \frac{\Delta v}{v} - \frac{\Delta(u+v)}{u+v}$
  - $\frac{\Delta f}{f} = \frac{\Delta u}{u} + \frac{\Delta v}{v} + \frac{\Delta u}{u+v} + \frac{\Delta v}{u+v}$
- Which of the following relation is wrong
  - 1 ampere  $\times$  1 ohm = 1 volt
  - 1 watt  $\times$  1 sec = 1 joule
  - 1  $\times$  newton per coulomb = 1 volt per meter
  - 1 coulomb  $\times$  1 volt = 1 watt
- The unit of self inductance of a coil is
  - Farad
  - Henry
  - Weber
  - Tesla
- Out of the following four dimensional quantities, which one qualifies to be called a dimensional constant?
  - Acceleration due to gravity
  - Surface tension of water
  - Weight of a standard kilogram mass
  - The velocity of light in vacuum
- 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.
  - $10^{21}$ m
  - $10^6$ m
  - $10^{-6}$ m
  - $10^0$ m
- The position of a particle at time  $t$  is given by the equation  $x(t) = \frac{v_0}{A} (1 - e^{At})$ ,  $v_0 = \text{constant}$  and  $A > 0$ . Dimensions of  $v_0$  and  $A$  respectively are
  - $[M^0LT^0]$  and  $[M^0L^0T^{-1}]$
  - $[M^0LT^{-1}]$  and  $[M^0LT^{-2}]$
  - $[M^0LT^{-1}]$  and  $[M^0L^0T]$
  - $[M^0LT^{-1}]$  and  $[M^0L^0T^{-1}]$

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8. One nanometre is equal to  
a)  $10^9 \text{ mm}$                       b)  $10^{-6} \text{ cm}$                       c)  $10^{-7} \text{ cm}$                       d)  $10^{-9} \text{ cm}$
9.  $[\text{ML}^2\text{T}^{-3}\text{A}^{-2}]$  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)  $[\text{M}^2\text{L}^2\text{T}^{-2}]$                       b)  $[\text{MLT}^{-2}]$                       c)  $[\text{ML}^2\text{T}^{-2}]$                       d)  $[\text{ML}^2\text{T}^{-1}]$
11. If the length of rod  $A$  is  $3.25 \pm 0.01 \text{ cm}$  and that of  $B$  is  $4.19 \pm 0.01 \text{ cm}$  then the rod  $B$  is longer than rod  $A$  by  
a)  $0.94 \pm 0.00 \text{ cm}$                       b)  $0.94 \pm 0.01 \text{ cm}$                       c)  $0.94 \pm 0.02 \text{ cm}$                       d)  $0.94 \pm 0.005 \text{ cm}$
12. The dimensions of  $e^2/4\pi\epsilon_0hc$ , where  $e$ ,  $\epsilon_0$ ,  $h$  and  $c$  are electronic charge, electric permittivity, Planck's constant and velocity of light in vacuum respectively, are  
a)  $[\text{M}^0\text{L}^0\text{T}^0]$                       b)  $[\text{ML}^0\text{T}^0]$                       c)  $[\text{M}^0\text{LT}^0]$                       d)  $[\text{M}^0\text{L}^0\text{T}^1]$
13. The length, breadth and thickness of a block are given by  $l = 12 \text{ cm}$ ,  $b = 6 \text{ cm}$  and  $t = 2.45 \text{ cm}$   
The volume of block according to the idea of significant figures should be  
a)  $1 \times 10^2 \text{ cm}^3$                       b)  $2 \times 10^2 \text{ cm}^3$                       c)  $1.763 \times 10^2 \text{ cm}^3$                       d) None of these
14. A physical quantity  $A$  is related to four observables  $a$ ,  $b$ ,  $c$  and  $d$  as follows  
$$A = \frac{a^2 b^3}{c \sqrt{d}}$$
  
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  $1/2 \epsilon E^2$  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  $0.00006 \text{ m}$ . It is equal to  
a)  $6 \text{ micron}$                       b)  $60 \text{ micron}$                       c)  $600 \text{ micron}$                       d)  $0.6 \text{ micron}$

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19. The unit of surface tension in SI system is  
a) *Dyne/cm<sup>2</sup>*      b) *Newton /m*      c) *Dyne/cm*      d) *Newton/m<sup>2</sup>*
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)  $[L^2T^{-2}]$