DPP

DAILY PRACTICE PROBLEMS

CLASS : XITH
DATE :

Solutions

SUBJECT : PHYSICS
DPP NO. : 9

Topic :-.UNITS AND MEASUREMENTS

1 **(c)**

Gravitational force, $F = \frac{GM_1M_2}{R^2}$

$\Rightarrow \quad G = \frac{FR^2}{M_1M_2}$

$[G] = \frac{[\mathrm{MLT^{-2}}][\mathrm{L^2}]}{[\mathrm{M^2}]}$

$= [\mathrm{M^{-1}L^3T^{-2}}]$

3 **(a)**

$[C] = \left(\frac{Q}{V}\right) = \left(\frac{Q^2}{W}\right) = \left[\frac{A^2T^2}{ML^2T^{-2}}\right] = [M^{-1}L^{-2}T^4A^2]$

4 **(a)**

Angular velocity = $\frac{\theta}{t}$, $[\omega] = \frac{[M^0L^0T^0]}{[T]} = [T^{-1}]$

5 **(c)**

Given, length of rod A is

$L_A = 3.25 \pm 0.01$

Of B is $L_B = 4.19 \pm 0.01$

Then, the rod B is longer than rod A by a length

$\Delta l = L_B - L_A$

$\Delta l = (4.19 \pm 0.01) - (3.25 \pm 0.01)$

$\Delta l = (0.94 \pm 0.02)cm$

6 **(c)**

Electric displacement, $D = \varepsilon E$

Unit of $D = \frac{C^2\ N}{Nm^2C}$

$\therefore \quad [D] = \left(\frac{C}{m^2}\right) = \frac{[AT]}{[L^2]} = [L^{-2}TA]$

7 **(a)**

If **E** is the intensity of electric field over a small area element **dS** and θ is angle between **E** and outdrawn normal to area element. Therefore, electric flux through this element is

$$d\phi_E = (dS)(E\cos\theta)$$

$$= E\,dS\cos\theta = \mathbf{E}.\mathbf{dS}$$

Hence, $\phi_E = E.S$

$$= \frac{V}{d}.S$$

$\therefore$ Unit of $\phi_E = \frac{\text{volt} \times \text{metre}^2}{\text{metre}}$

$$= \text{volt} - \text{metre}$$

8 **(d)**

Diameter = Main scale reading

$$+ \text{ Circular scale reading} \times \text{LC} + \text{Zero error}$$

$$= 3 + 35 \times \frac{1}{2 \times 50} + 0.03 = 3.38 \text{ mm}$$

9 **(c)**

$F = -\eta.A\frac{dv}{dx} \Rightarrow [\eta] = [ML^{-1}T^{-1}]$

10 **(d)**

Torque = $[ML^2T^{-2}]$, Moment of inertia $[ML^2]$

11 **(a)**

$\eta = \frac{F}{av} = \frac{[MLT^{-2}]}{[L][LT^{-1}]} = [ML^{-1}T^{-1}]$

12 **(a)**

Required relative error=power × relative error in x.

13 **(c)**

Since for 50.14 cm, significant number = 4 and for 0.00025, significant number = 2

14 **(a)**

Kinetic energy $= \frac{1}{2}mv^2 = M[LT^{-1}]^2 = [ML^2T^{-2}]$

15 **(b)**

T-ratios are dimensionless. So the unit of r is N^2.

16 **(a)**

$30\ VSD = 29\ MSD$

$1\ VSD = \frac{29}{30}\ MSD$

$L.C. = 1\ MSD - 1\ VSD$

$= \left(1 - \frac{29}{30}\right) MSD = \frac{1}{30} \times 0.5° = 1$ minute

17 **(d)**

[Pressure]=[Stress]=[coefficient of elasticity] =$[ML^{-1}T^{-2}]$

18 **(a)**

$I = \frac{Q}{t} = \frac{[Q]}{[T]} = [M^0L^0T^{-1}Q]$

19 **(c)**

$T = 2\pi\sqrt{l/g} \Rightarrow T^2 = 4\pi^2 l/g \Rightarrow g = \frac{4\pi^2 l}{T^2}$

Here, % error in $l = \frac{1mm}{100cm} \times 100 = \frac{0.1}{100} \times 100 = 0.1\%$

And % in error in $T = \frac{0.1}{2 \times 100} \times 100 = 0.05\%$

$\therefore$ % error in g = % error in l +2(% error in T)

$= 0.1 + 2 \times 0.05 = 0.2$ %

20 **(d)**

The number of significant figures in 4.8000×10^4 is 5 (zeros on right after decimal are counted while zeros in powers of 10 are not counted).

The number of significant figures in 48000.50 is 7 (all the zeros between two non-zero digits are significant).

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	C	B	A	A	C	C	A	D	C	D
Q.	11	12	13	14	15	16	17	18	19	20
A.	A	A	C	A	B	A	D	A	C	D