# Jupiter Academy

**Subjects : Physics** **PRACTICE PAPER 01**

**Total Marks : 180** **( Solutions )**

## Physics - Section A ( MCQ )

**1.** The main scale of vernier callipers reads in millimetre and its vernier is divided into $8$ divisions, which coincides with $5$ divisions of main scale. When two jaws of instrument touch each other, the zero of the vernier coincides with the zero of main scale. A rod is tightly placed along its length between both jaws. It is observed that the zero of vernier scale lies just left to $36^{th}$ division of main scale and fourth division of vernier scale coincides with the main scale Then the measured value is ..... $cm$

**A)** $3.66$ **B)** $3.55$ **C)** $3.65$ **D)** $3.56$

**Solution : (Correct Answer: B )**

**2.** Consider the following equation of Bernouilli's theorem. $P + \frac{1}{2}\rho V^2 + \rho gh = K$ (constant)The dimensions of $K/P$ are same as that of which of the following

**A)** Thrust **B)** Pressure **C)** Angle **D)** Viscosity

**Solution : (Correct Answer: C )**

(c) $P + \frac{1}{2}\rho v^2 + \rho gh = K$ (constant)

So, according to principle of homogeneity,

dimensions of $\mathrm{K}$ = dimensions of $\mathrm{P}$

$\therefore \frac{K}{P}$ will be dimensionless,

Thus, dimensions of $\frac{K}{P}$ will be same as that of angle (because angle is also dimensinoless quantity),

**3.** The unit of Stefan-Boltzmann s constant $(\sigma)$ is

**A)** $\frac{watt^4}{m\times K^4}$ **B)** $\frac{calorie}{m^2\times K^4}$
**C)** $\frac{watt}{m^2\times K^4}$ **D)** $\frac{joule}{m^2\times K^4}$

**Solution : (Correct Answer: C )**

According to $Stefan - Boltzmann's$ Law, energy radiated per sec per unit area is:

$E = e\sigma\left(T^4 - T_0^4\right)$

Hence, unit of $\sigma = \frac{\text{joule/sec}-m^2}{K^4} = \frac{\text{watt}}{m^2\times K^4}$

**4.** The focal power of a lens has the dimensions

**A)** $[L]$ **B)** $[ML^2T^{-3}]$
**C)** $[L^{-1}]$ **D)** $[ML^{-3}]$

**Solution : (Correct Answer: C )**

(c)

Focal length $\Rightarrow f = [L]$

**5.** With the usual notations, the following equation $S_t = u + \frac{1}{2}a(2t-1)$ is

**A)** Only numerically correct
**B)** Only dimensionally correct
**C)** Both numerically and dimensionally correct
**D)** Neither numerically nor dimensionally correct

**Solution : (Correct Answer: C )**

(c) We can derive this equation from equations of motion so it is numerically correct.

$S_t$= distance travelled in $t^{th}$ second $= \frac{\text{Distance}}{\text{time}}$ $= [LT^{-1}]$

$u$ = velocity = $[LT^{-1}]$ and $\frac{1}{2}a(2t-1) = [LT^{-1}]$

As dimensions of each term in the given equation are same, hence equation is dimensionally correct also.

**6.** The quantities $A$ and $B$ are related by the relation, $m = A/B$, where $m$ is the linear density and $A$ is the force. The dimensions of $B$ are of

**A)** Pressure **B)** Work
**C)** Latent heat **D)** None of the above

**Solution : (Correct Answer: C )**

(c) $m$ = linear density = mass per unit length = $\left[\frac{M}{L}\right]$

$A = force = [MLT^{-2}]$ [B]=$\frac{[A]}{[m]} = \frac{[MLT^{-2}]}{[ML^{-1}]} = [L^2T^{-2}]$

This is same dimension as that of latent heat.

**7.** A public park, in the form of a square, has an area of $(100 \pm 0.2)m^2$. The side of park is ..... $m$

**A)** $(10 \pm 0.01)$ **B)** $(10 \pm 0.1)$
**C)** $(10 \pm 0.02)$ **D)** $(10 \pm 0.2)$

**Solution : (Correct Answer: A )**

(a)

$A = (100 \pm 0.2)\, m^2$

$100 = l^2 \Rightarrow l = 10\, m$

$\frac{\Delta A}{A} = \frac{2\Delta l}{l}$

$\frac{0.2}{100} = 2 \times \frac{\Delta l}{10}$

$\Rightarrow \Delta = 0.01\, m$

So, length $= (10 \pm 0.01)\, m$

**8.** The unit of length, velocity and force are doubled. Which of the following is the correct change in the other units?

**A)** Unit of time is doubled
**B)** Unit of mass is doubled
**C)** Unit of momentum is doubled
**D)** Unit of energy is doubled

**Solution : (Correct Answer: C )**

(c)

$p = F \times t$

$p' = 2F \times t$

$p' = 2p$

**9.** Which of the following is not a unit of self-inductance

**A)** $Weber/Ampere$
**B)** $Ohm - Second$
**C)** $Joule - Ampere$
**D)** $oule - Ampere^{-2}$

**Solution : (Correct Answer: C )**

**10.** The radius of a circle is $2.12$ metre. Its area according to the rule of significant figures is ..... $m^2$

**A)** $14.1$ **B)** $14.112$
**C)** $14.11$ **D)** $14.1124$

**Solution : (Correct Answer: A )**

(a)

**11.** If $A$ and $B$ are two physical quantities having different dimensions then which of the following can't denote a physical quantity?

**A)** $A + \frac{A^3}{B}$ **B)** $\exp\left(-\frac{A}{B}\right)$
**C)** $AB^2$ **D)** $\frac{A}{B^4}$

**Solution : (Correct Answer: B )**

For $(1)$: A and $\frac{\mathrm{A}^3}{\mathrm{B}}$ may have same dimension.

For $(2)$ : As $A$ and $B$ have different dimen-

sion so $\exp\left(-\frac{\mathrm{A}}{\mathrm{B}}\right)$ is meaningless.

For $(3)$ : $\mathrm{AB}^2$ is meaningful.

For $4)$ : $\mathrm{AB}^{-4}$ is meaningful.

**12.** The volume of a sphere is $1.76\ cm^3$. The volume of $25$ such spheres taking into account the significant figure is

**A)** $0.44 \times 10^2\ cm^3$ **B)** $44.0\ cm^3$
**C)** $44\ cm^3$ **D)** $44.00\ cm^3$

**Solution : (Correct Answer: B )**

Volume of 1 sphere $= 1.76\mathrm{cm}^3$

Volume of 25 spheres $= 25 \times 1.76$

$= 44\mathrm{cm}^3$

$= 44.0\mathrm{cm}^3$

(Since volume is reported in 3 significant figure)

**13.** Two resistance are measured in $Ohm$ and is given as $R_1 = 3\Omega \pm 1\%$ and $R_2 = 6\Omega \pm 2\%$ When they are connected in parallel, the percentage error in equivalent resistance is..... $\%$

**A)** $3$ **B)** $4.5$ **C)** $0.67$ **D)** $1.33$

**Solution : (Correct Answer: D )**

$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$

$\frac{\mathrm{dR_{eq}}}{\mathrm{R_{eq}^2}} = \frac{\mathrm{dR_1}}{\mathrm{R_1^2}} + \frac{\mathrm{dR_2}}{\mathrm{R_2^2}}$

$\Rightarrow \frac{dR_{eq}}{R_{eq}} = R_{eq}\left\{\frac{dR_1}{R_1} \times \frac{1}{R_1} + \frac{dR_2}{R_2} \times \frac{1}{R_2}\right\}$

$\%$ error $= 2\left\{\frac{1}{3} + \frac{2}{6}\right\}$

$= \frac{4}{3}\% = 1.33\%$

**14.** A system has basic dimensions as density $[D]$, velocity $[V]$ and area $[A]$. The dimensional representation of force in this system is

**A)** $[AV^2D]$ **B)** $[A^2VD]$
**C)** $[AVD^2]$ **D)** $[A^0VD]$

**Solution : (Correct Answer: A )**

$\mathrm{F} = \mathrm{Ma} =$ volume $\times$ density $\times \left(\frac{\mathrm{L}}{\mathrm{T}^2}\right)$

$= (\text{ Area } \times \text{ length }) \times$ density $\times \frac{\mathrm{L}}{\mathrm{T}^2}$

$\left[\text{ velocity } \mathrm{v}^2 = \frac{\mathrm{L}^2}{\mathrm{T}^2}\right]$

$= \left[\mathrm{Av}^2\mathrm{D}\right]$

**15.** Which of the following is the most precise device for measuring length

**A)** a vernier callipers with $20$ divisions on the sliding scale
**B)** a screw gauge of pitch $1\ mm$ and $100$ divisions on the circular scale
**C)** an optical instrument that can measure length to within a wavelength of light
**D)** Precison can not be changed by changing the instrument.

**Solution : (Correct Answer: C )**

**16.** The fundamental unit which has the same power in the dimension formula of surface tension and viscosity is

**A)** mass **B)** length **C)** time **D)** None of the above

**Solution : (Correct Answer: A )**

dimensions for coefficient of viscosity $= [ML^{-1}T^{-1}]$

dimensions for surface tension $= [MLT^{-2}]$

**17.** A scientist performs an experiment in order to measure a certain physical quantity and takes $100$ observations. He repeats the same experiment and takes $400$ observations. By doing so,

**A)** the possible error remains same.
**B)** the possible error is doubled.
**C)** the possible error is halved.
**D)** the possible error is reduced to one fourth.

**Solution : (Correct Answer: D )**

Mean error $\Delta x_m = \frac{\sum \Delta x}{n}$ where $n$ is the total number of observations.

Increasing the number of observation by 4 times, will probably reduce the possible error to one-fourth.

**18.** The maximum percentage errors in the measurement of mass (M), radius (R) and angular velocity $(\omega)$ of a ring are $2\%, 1\%$ and $1\%$ respectively, then find the maximum percenta? error in the measurement of its rotational kinetic energy $\left(K = \frac{1}{2} I\omega^2\right)$

**A)** $3$ **B)** $6$ **C)** $4$ **D)** $1$

**Solution : (Correct Answer: B )**

Rotational kinetic energy $(K) = \frac{1}{2} I\omega^2 = \frac{1}{2} MR^2\omega^2$

$\therefore \frac{\Delta K}{K} \times 100 = \frac{\Delta M}{M} \times 100 + 2\frac{\Delta R}{R} \times 100 + 2\frac{\Delta \omega}{\omega} \times 100$

$= 2\% + (2 \times 1\%) = 6\%$

**19.** In a particular system the units of length, mass and time are chosen to be $10\ cm, 10\ g$, and $0.1\ s$ respectively. The units of force in this system will be equal to?

**A)** $0.1$ **B)** $1$ **C)** $10$ **D)** $100$

**Solution : (Correct Answer: A )**

$1 newton = 1 kgm/s^2$

$1kg = 10^3$ and $1m = 10^2 cm$

$1N = \frac{(10^3 g)(10^2 cm)}{s^2}$

$1N = \frac{100 \times (10g) \times 10(10cm)}{100 \times (0.1s)^2}$

$= 10 \times \frac{(10g)(10cm)}{(0.1s)^2}$

$1N = 10\times$ New unit of force Thus, New unit $= 1/10$ $= 0.1N$

**20.** The dimensions of $K$ in the equation $W = \frac{1}{2}\ Kx^2$ is

**A)** $M^1L^0T^{-2}$
**B)** $M^0L^1T^{-1}$
**C)** $M^1L^1T^{-2}$
**D)** $M^1L^0T^{-1}$

**Solution : (Correct Answer: A )**

(a) $W = \frac{1}{2}kx^2 \Rightarrow [k] = \frac{[W]}{[x^2]} = \left[\frac{ML^2T^{-2}}{L^2}\right] = [MT^{-2}]$

**21.** The dimensions of inter atomic force constant are

**A)** $MT^{-2}$ **B)** $MLT^{-1}$
**C)** $MLT^{-2}$ **D)** $ML^{-1}T^{-1}$

**Solution : (Correct Answer: A )**

(a) $K = Y \times r_0 = [ML^{-1}T^{-2}] \times [L] = [MT^{-2}]$

$Y$= Young's modulus and $r_0$ = Interatomic distance

**22.** Match List-I with List-II and select the correct answer using the codes given below the lists

| List$-I$ | List $-II$ |
|---|---|
| $I-$ Joule | $A-$Henry $\times$ Amp/sec |
| $II-$ Watt | $B-$Farad $\times$ Volt |
| $III-$ Volt | $C-$Coulomb $\times$ Volt |
| $IV-$ Coulomb | $D-$ Oersted $\times$ cm |
| | $E-$ Amp $\times$ Gauss |
| | $F-$ $Amp^2 \times$ Ohm |

**A)** $I-A, II-F, III-E, IV-D$
**B)** $I-C, II-F, III-A, IV-B$
**C)** $I-C, II-F, III-A, IV-E$
**D)** $I-B, II-F, III-A, IV-C$

**Solution : (Correct Answer: B )**

(b)

**23.** Time period $T \propto P^a\ d^b\ E^c$ then value of $c$ is given $p$ is pressure, $d$ is density and $E$ is energy

**A)** $-\frac{5}{6}$ **B)** $\frac{1}{2}$ **C)** $\frac{1}{3}$ **D)** $1$

**Solution : (Correct Answer: C )**

$T \alpha p^a d^b E^c$

$T = M^0L^{-1}$

$P = [ML^{-1}T^{-2}]$

$d = [ML^{-3}]$

$E = [ML^2T^{-2}]$

$M^0 \cdot T' = [ML^{-1}T]^a\ [ML^{-3}]^b\ [ML^2T^{-2}]^c$

$a + b + c = 0 - (1)$

$-a - 3b + 2c = 0 - (2)$

$-2a - 3b - 2c = 0 - (3)$

Solve $eq^n(1), (2) \Delta (3)$

$a = \frac{-5}{6}, b = \frac{1}{2}, c = \frac{1}{3}$

**24.** $Joule - second$ is the unit of

**A)** Work **B)** Momentum
**C)** Pressure **D)** Angular momentum

**Solution : (Correct Answer: D )**

(d) $\tau = \frac{dL}{dt}$

$\Rightarrow dL = \tau \times dt = r \times F \times dt$

i.e. the unit of angular momentum is joule-second.

**25.** If $C$ and $L$ denote capacitance and inductance respectively, then the dimensions of $LC$ are

**A)** $M^0L^0T^0$ **B)** $M^0L^0T^2$
**C)** $M^2L^0T^2$ **D)** $MLT^2$

**Solution : (Correct Answer: B )**

(b) $f = \frac{1}{2\pi\sqrt{LC}} \Rightarrow LC = \frac{1}{f^2} = [M^0L^0T^2]$

**26.** The dimensional formula for a physical quantity $x$ is $[M^{-1}L^3T^{-2}]$. The errors in measuring the quantities $M, L$ and $T$ respectively are $2\%, 3\%$ and $4\%$. The maximum percentage of error that occurs in measuring the quantity $x$ is

**A)** 9 **B)** 10 **C)** 14 **D)** 19

**Solution : (Correct Answer: D )**

$x = M^{-1}L^3T^{-2}$

$\frac{\Delta x}{x} \times 100 = \frac{\Delta M}{M} \times 100 + \frac{3\Delta L}{L} \times 100 + \frac{2\Delta T}{T} \times 100$

$= 2\% + 3 \times 3\% + 2 \times 4\% = 2\% + 9\% + 8\%$

$= 19\%$

**27.** The number of significant figures in all the given numbers $25.12, 2009, 4.156$ and $1.217 \times 10^{-4}$ is

**A)** 1 **B)** 2 **C)** 3 **D)** 4

**Solution : (Correct Answer: D )**

(d) The number of significant figures in all of the given number is 4.

**28.** If there is a positive error of $50\%$ in the measurement of velocity of a body, then the error in the measurement of kinetic energy is ..... $\%$

**A)** 25 **B)** 50 **C)** 100 **D)** 125

**Solution : (Correct Answer: D )**

(d) Kinetic energy $E = \frac{1}{2}mv^2$

$\therefore \quad \frac{\Delta E}{E} \times 100 = \frac{v'^2 - v^2}{v^2} \times 100$

$= [(1.5)^2 - 1] \times 100$

$\therefore \quad \frac{\Delta E}{E} \times 100 = 125\%$

**29.** Which one of the following does not have the same dimensions

**A)** Work and energy
**B)** Angle and strain
**C)** Relative density and refractive index
**D)** Planck constant and energy

**Solution : (Correct Answer: D )**

(d) [Planck constant] = $[ML^2T^{-1}]$ and [Energy] = $[ML^2T^{-2}]$

**30.** The dimension of the ratio of angular to linear momentum is

**A)** $M^0L^1T^0$
**B)** $M^1L^1T^{-1}$
**C)** $M^1L^2T^{-1}$
**D)** $M^{-1}L^{-1}T^{-1}$

**Solution : (Correct Answer: A )**

(a) $\frac{\text{Angular momentum}}{\text{Linear momentum}} = \frac{mvr}{mv} = r = [M^0L^1T^0]$

**31.** Which one has the dimensions different from the remaining three

**A)** Power **B)** Work **C)** Torque **D)** Energy

**Solution : (Correct Answer: A )**

(a) Power = $\frac{\text{Energy}}{\text{Time}}$

**32.** The unit of reactance is

**A)** Ohm **B)** Volt **C)** Mho **D)** Newton

**Solution : (Correct Answer: A )**

(a)

**33.** Dimensional formula for volume elasticity is

**A)** $M^1L^{-2}T^{-2}$
**B)** $M^1L^{-3}T^{-2}$
**C)** $M^1L^2T^{-2}$
**D)** $M^1L^{-1}T^{-2}$

**Solution : (Correct Answer: D )**

(d) Volume elasticity = $\frac{\text{Force/Area}}{\text{Volumestrain}}$

Strain is dimensionless, so

= $\frac{\text{Force}}{\text{Area}} = \frac{MLT^{-2}}{L^2} = [ML^{-1}T^{-2}]$

**34.** Select the pair whose dimensions are same

**A)** Pressure and stress **B)** Stress and strain
**C)** Pressure and force **D)** Power and force

**Solution : (Correct Answer: A )**

(a) Pressure = $\frac{\text{Force}}{\text{Area}} = ML^{-1}T^{-2}$

Stress = $\frac{\text{Restoringforce}}{\text{Area}} = ML^{-1}T^{-2}$

**35.** Which does not has the same unit as others

**A)** Watt-sec **B)** Kilowatt-hour
**C)** eV **D)** J-sec

**Solution : (Correct Answer: D )**

(d) Joule-sec is the unit of angular momentum where as other units are of energy.

**36.** Which relation is wrong

**A)** 1 Calorie $= 4.18$ Joules

**B)** $1\,\mathring{A} = 10^{-10}m$

**C)** $1\ MeV = 1.6 \times 10^{-13} Joules$

**D)** $1\,Newton = 10^{-5} Dynes$

**Solution : (Correct Answer: D )**

(d) 1 Newton $= 10^5$ Dyne

**37.** The unit of angular acceleration in the SI system is

**A)** $N\,kg^{-1}$

**B)** $m\,s^{-2}$

**C)** $rad\,s^{-2}$

**D)** $m\,kg^{-1}K$

**Solution : (Correct Answer: C )**

(c) Angular acceleration $= \frac{\text{Angular velocity}}{\text{Time}} = \frac{rad}{\sec^2}$

**38.** $1kWh =$

**A)** $1000W$ **B)** $36 \times 10^5 J$

**C)** $1000J$ **D)** $3600\,J$

**Solution : (Correct Answer: B )**

(b) $1\,kWh = 1 \times 10^3 \times 3600\,W \times \sec = 36 \times 10^5 J$

**39.** One second is equal to

**A)** $1650763.73$ time periods of $Kr$ clock

**B)** $652189.63$ time periods of $Kr$ clock

**C)** $1650763.73$ time periods of $Cs$ clock

**D)** $9192631770$ time periods of $Cs$ clock

**Solution : (Correct Answer: D )**

(d) It is by standard definition.

**40.** $Assertion$ : The error in the measurement of radius of the sphere is $0.3\%$. The permissible error in its surface area is $0.6\%$

$Reason$ : The permissible error is calculated by the formula $\frac{\Delta A}{A} = \frac{4\Delta r}{r}$

**A)** If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

**B)** If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

**C)** If the Assertion is correct but Reason is incorrect.

**D)** If both the Assertion and Reason are incorrect.

**Solution : (Correct Answer: C )**

$Area\,of\,the\,sphere,\ A = 4\pi r^2$

$\%\,error\,in\,area\ = 2 \times \%\,error\,in\,radius$

$i.e,\ \frac{\Delta A}{A} \times 100 = 2 \times \frac{\Delta r}{r} \times 100$

$= 2 \times 0.3\% = 0.6\%$

$But \frac{\Delta A}{A} = 4\frac{\Delta r}{r}\ is\ false.$

**41.** The speed of light $(c)$, gravitational constant $(G)$ and planck's constant $(h)$ are taken as fundamental units in a system. The dimensions of time in this new system should be

**A)** $G^{1/2}h^{1/2}c^{-5/2}$ **B)** $G^{-1/2}h^{1/2}c^{1/2}$

**C)** $G^{1/2}h^{1/2}c^{-3/2}$ **D)** $G^{1/2}h^{1/2}c^{1/2}$

**Solution : (Correct Answer: A )**

Let time, $T \propto c^x G^y h^z$

$\Rightarrow T = kc^x G^y h^z$

Taking dimensions on both sides $[M^0L^0T^1]$ $= \left[LT^{-1}\right]^x \left[M^{-1}L^3T^{-2}\right]^y \left[ML^2T^{-1}\right]^z$

$i.e$

$[M^0L^0T^1] = [M^{-y+z}L^{x+3y+2z}T^{-x-2y-z}]$

Equating power of $M, L,$ Ton both sides, we get

$-y + z = 0 \quad ...(1)$

$x + 3y + 2z = 0 \quad ...(2)$

$-x - 2y - z = 1 \quad ....(3)$

From $(1) \Rightarrow z = y$

Adding (2) and $(3) \Rightarrow y + z = 1$

or $2y = 1 \quad [\text{ From }]$

i.e, $y = \frac{1}{2}$

$\therefore z = y = \frac{1}{2}$

Putting these values in (2) we get $x + \frac{3}{2} + 1 = 0$ or $x = \frac{-5}{2}$

Hence, $[T] = \left[G^{1/2}h^{1/2}c^{-5/2}\right]$

**42.** 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)** $a = L,\ b = LT,\ c = T^2$

**Solution : (Correct Answer: C )**

(c) From the principle of dimensional homogenity $[v] = [at] \Rightarrow [a] = [LT^{-2}]$.

Similarly $[b] = [L] \text{and } [c] = [T]$

**43.** In an experiment four quantities $a, b, c$ and $d$ are measured with percentage error $1\%, 2\%, 3\%$ and $4\%$ respectively. Quantity $P$ is calculated as follows $P = \frac{a^3b^2}{cd}$. $\%$ error in $P$ is ..... $\%$

**A)** $14$ **B)** $10$ **C)** $7$ **D)** $4$

**Solution : (Correct Answer: A )**

As, $P = \frac{a^3b^2}{cd}$

$\%$, error, in, $P$, is

$\frac{\Delta P}{P} \times 100 = \left[3\left(\frac{\Delta a}{a}\right) + 2\left(\frac{\Delta b}{b}\right) + \frac{\Delta c}{c} + \frac{\Delta d}{d}\right] \times 100$

$= 3\left[3 \times 1\% + 2 \times 2\% + 3\% + 4\%\right] = 14\%$

**44.** The percentage errors in the measurement of mass and speed are $2\%$ and $3\%$ respectively. How much will be the maximum error in the estimation of the kinetic energy obtained by measuring mass and speed ..... $\%$

**A)** $12$ **B)** $8$ **C)** $2$ **D)** $10$

**Solution : (Correct Answer: B )**

$E = \frac{1}{2}mv^2$

$\%$ Error in $K.E. = \%$ error in mass $+2 \times \%$ error in velocity $= 2 + 2 \times 3 = 8\%$

**45.** Length cannot be measured by

**A)** Fermi **B)** Debye

**C)** Micron **D)** Light year

**Solution : (Correct Answer: B )**

The length can be measured in terms of Fermi, Micron and Light year. whereas a unit used to express electric dipole moments of molecules is $debye$.