Unit-1 Important Formula

# SUMMARY

* Measurement of large distance (Parallax Method)

equation D = b



where D = distance of the planet from the earth. where  = parallax angle.

b = distance between two place of observation.

* Measurement of the size of a planet or a star.

equation   d

D

where D = distance of planet from the earth, d = diameter of planet.

  angular diameter of planet.

* Measurement of mass

The gravitational force on an object, of mass m, is called the weight of the object. 1 amu = 1.66  1027 kg = 1u

* Estimation of Error

Absolute Error - Suppose the values obtained in several measurement of physical quantity

*a* are *a*1, *a*2, ............... *a*n If their arithmetic mean is a

*a*1  *a*2 *+*....  *an* 1 *n*

then *a* 

*n*

  *ai*

*i* 1

*n*

 *a*1 = *a* - *a*1,  *a*2 = *a* - *a*2 ,----------  *a*n = *a* - *a*n

*a*2, *a*2 *-------* *an* are called absolute error

* Average absolute error



*i*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *a*1 |  | *a*2 | ...  | *an* |

*a* 

*n*

*a*

* Fractional Error  *a* = *a*
* Percentage Error

 1 *n a n i* 1

Percentage error = a  100 % =

* Combination of errors

a 100 % a

Addition Z = A + B 

Z  A  B

Substraction Z = A – B 

Z  A  B

Division Z = A

B

 Z  A  B Z A B

Multiplication Z = A • B 

Z  A  B Z A B

Power Z = An 

Z  n A Z A

* Rule for determining number of significant figures
  + All the non - zero digits are significant
  + All the zeros between two non zero digits are significant no matter where the decimal point is it at all.
  + If the number is less then 1 then zeros on the right of decimal point but to the left of the first non - zero digit are not significant.
  + In a number without decimal point the zeros on the right side of the last non zero digit are not significant.
* Dimensions and Dimensional formulas.
  + The expression of a physical quantity with appropriate powers of M, L, T, K, A etc is called the dimensional formula of that physical quantity.
  + The power of exponents of M, L, T, K, A are called dimensions of that quantity.
* • Some important units of distance

1 fermi (fm)  10–15 m

o

1 A  10–10 m

1 AU  1.496 1011m

1 light year  9.46 1015 m 1 parsec  3.08 1016 m

# MCQ Questions

**For the answer of the following questions choose the correct alternative from among the given ones.**

Physics - scope and Excitement

* Physics, Technology and society.
* Fundamental sources of nature.
* Nature of Physical laws

1. Physics is one of the basic disciplines in the category of sciences.
   1. Astro (B) Natural (C) Space (D) Genetic
2. ‘Physics’ comes from a ............... word meaning nature
   1. Hindi (B) German (C) Greek (D) Sanskrit
3. Mechanics and newton’s motion laws as ............... laws dependad.

(a) liner momentum (b) Energy conservation

(c) Gravitational (d) Charge conservation

1. What is the approximate value of the Radious of a nucleus ?

(a)

10–14 m (b)

10–31 m (c)

10–19 m (d)

10–15 m

1. The scope for ratio of length is in order to ...............

(a)

10–40

(b)

1040

(c)

1020

(d)

1030

6. The range of time scale is about ...............

(a)

(b)

10–10 sec to 1026 sec (c)

10–22 sec to 1018 sec (d)

10–15 sec to 1015 sec

1020 sec to 1025 sec

1. Birth, evolution and death of stars etc. are studid in branch of physics known as ...............
   1. Thermodynamics (c) Astro physics
   2. Quantam physics (d) Electronics
2. ............... is a branch of physics in wich heat engine and refrigeratior efficiency is studied.
   1. optics (b) Thermodynamics (c) Mechanics (d) Quantom physics
3. What is full name of LHC
   1. Large hadron collider (c) Large heavy cullent
   2. Large hadron cullent (d) Light heavy cullent
4. The range of mass varies from ...............

(a)

10–15 kg to 1026 kg (b)

10–20 kg to 1028 kg (c)

10–30 kg to 1055 kg (d)

10–20 kg to 1020 kg

1. Length of Galaxies is in order of ...............

(a)

1026 m (b)

1036 m (c)

1028 m (d)

10–14 m

1. The approximate value of charge of an electron is ...............

(a)

10–18c (b)

1015 c

(c)

10–38c (d)

10–19 c

1. The universe is made up of ...............
   1. matter only (b) radiation only (c) vaccum (d) matter and radiation
2. Nucleus of molecule is made up of wich fundamental constituents ?
   1. only Electron (c) Electron and Proton
   2. Proton and neutron (d) Electron and neutron
3. In the development of nenotechnology and biotechnology ............... have played a vital role.
   1. ECG (b) ESR (c) NMR (d) AFM
4. What is full form of AFM ?
   1. Atomatic force mioroscope (c) Atomatic fire microscope
   2. Atomic force mirror (d) Atomic force microscope
5. What is full name of ECG ?
   1. Electron cardiograph (c) Electron colour gram
   2. Electro cardiograph (d) Electric colour graph
6. What is full name of ESR ?
   1. Electric space Radar (c) Electron spin Resonance
   2. Electron space Range (d) Electric spin Resonance
7. What is full name of NMR ?
   1. Nuclear magnetic Resonance (c) Nuclear mega Radar
   2. Neutron mega Resonance (d) Nuclear micro Radar
8. deals with electric charge and magnatic phenomenna
   1. Dynamics (b) Electro dynamic (c) Themodynamic (d) Mechanis
9. At present state, there are .............. fundamental forces in nature.
   1. six (b) four (c) two (d) five
10. When charges are at rest the force is given by law.
    1. coulomb’s (b) Newton’s (c) Ampere’s (d) Faraday’s
11. The force is the force of mutual attraction between any two objects by virtue of their

masses.

* 1. Weak (b) Electromagnetic (c) Nuclear (d) Gravitational

1. The ............... force is the strongest of all fundamental forces.
   1. nuclear (b) Electromagnetic (c) Gravitational (d) Weak nuclear
2. Electromagnetic force is ...............
   1. attractive force only (c) repulsive force only
   2. attractive and repulsive force (d) a short range force
3. Which of the following force binds The particle in the nucleons ?
   1. Electromagnetic force (b) Strong force (c) Gravitational force (d) Weak force
4. Electromagnetic force is range force
   1. Short (b) long (c) medium (d) very short
5. Quarks - Quarks force is produced between -
   1. Proton - neutron (b) proton - proton (c) neutron - neutron (d) (a),(b), (c) are true
6. Which partical are emitted during the  decay from the nucleus ?
   1. neutron and proton (c) electron and neutrino
   2. electron and neutron (d) electron and proton
7. ............... and ............... law’s are called inverse square law
   1. Gravitation and weak (c) Coulomb’s and strong
   2. Gravitation and coulomb’s (d) Electromagnetic and coulomb’s
8. Which property of object is responsible for the electric force ?
   1. electric charge (b) pressure (c) volume (d) mass
9. Which property of object is responsible for the Gravitational force.
   1. electric charge (b) mass (c) pressure (d) volume
10. How much times is the strong nuclear force stronger then weak nuclear force ?

(a)

1013

(b)

102

(c)

10–13

(d)

10–2

34. How much times is the strong nuclear force stronger then electro magnatic force ?

(a)

1013

(b)

102

(c)

10–13

(d)

10–2

35. How much times is the electromagnatic force stronger then Gravitational force

(a)

1013

(b)

10–13

(c)

1036

(d)

10–36

1. Who has unified electromagnetism and optics ?
   1. Newton (b) Maxwell (c) Coulomb (d) Faraday
2. Who has unified terrestrial and celestial domains under a common law of Gravitational
   1. Newton (b) Maxwell (c) Coulomb (d) Farady
3. The weak nuclear force, Gravitational force and electromagnatic force are A, B and C Respectively then ...............
   1. C > A > B (b) C > A < B (c) B > A > C (d) C < A < B
4. Range of weak nuclear force is ...............

(a)

10–15 km (b)

10–14 km (c)

10–18 km (d)

10–20 km

1. Strong nuclear force close not exist on ...............
   1. Proton (b) nuclear (c) neutron (d) electron
2. The force acting between two point charges kept at a certain distance is F1 Now magnitude of charge are double and distance between them is double. The force acting between them is F2 find out the ratio of F2/F1 = ...............

(a) 16 : 1 (b) 1: 16 (c) 1: 1 (d) 1: 8

1. If the resulting external force acting on system is zero then of the system is constant

and if the resultant external torque acting on a system is zero then of the system is

constart.

* 1. total energy, angularmomentum (c) linermomentam, energy
  2. liner momentam, angularmomentum (d) angular and linear momentam

1. Space is homogeneous and isotropic so ............... law of servation is the result of this
   1. linear and angular momentum (c) energy and charge
   2. angular and linear momentum (d) charge and energy
2. Time is homogeneous so ............... law of conserbation is the result of this
   1. angular momentum (b) linear momentum (c) energy (d) charge
3. The basic reason behind existance of which conseration of law is still not known ?
   1. angular momentum (c) energy
   2. linear momentum (d) charge
4. The Gravitational force between any two body charges with distance as F  rn where n = ..........

(a) –1 (b) 2 (c) –3 (d) –2

1. Match the column

Column - I Column - II

1. space is isotropic (P) conservation of linear momentum
2. space is homogeneous (Q) conservation of energy
3. Time is homogeneous (R) conservation of charge still not known
4. Time is isotropic (S) conservation of angular momentam (a) 1- (S), 2-(P), 3-(R), 4-(Q) (c) 1-(P), 2-(S), 3-(R), 4-(Q)

(b) 1-(S), 2-(P), 3-(Q), 4-(R) (d) 1-(R), 2-(Q), 3-(P), 4-(S)

**Measurement and system of units**

* Units of physical quantities, system of units, SI system of units, fundamental or Base units. precision in measurement. Error in measurement and significant figures.
* Dimensions and Dimensional formula, Dimensional analysis and its uses.

1. Which of the following unit is not of length ?
   1. light year (b) fermi (c)

o

A (d) becquerel

1. becquerel is a ............... unit and its symbol is ...............
   1. supplementary, B*q* (b) fundamental, B*q* (c) derived, B*q* (d) derived, B*v*
2. How many fundamental units are there in SI system ?

(a) 5 (b) 7 (c) 6 (d) 4

1. Which of the following physical quantity is fundamental ?
   1. viscosity (b) velocity (c) force (d) time
2. Poise is the unit of
   1. viscosity (b) velocity (c) force (d) time
3. Which unit of physical quantity remains same for all unit system ?
   1. meter (b) second (c) ampere (d) kilogram
4. Which of the following system of unit is not based on only units of mass length and time.
   1. SI (b) MKS (c) CGS (d) FPS
5. Which of the following symbol of unit does not follow practical norms for the use of SI system ?
   1. Kg (b) kg. (c) k (d) A
6. Why derive luminous intensity simbol form of SI system ?
   1. cd (b) Cd (c) cd. (d) CD
7. What is the ratio of 10 micron to 1 nenometer ?

(a)

104

(b)

103

(c)

1016

(d)

1015

58.

1 fem to m eter

1 00 n en o m eter = ...............

(a)

10–6

(b)

10–8

(c)

1024

–11 Nm2

(d)

10–24

59. If value of gravitational constant in MKS is

dyn cm2

6.67 10 kg2

then value of G in

CGS = ...............

gm2

(a)

6.67 10–9

(b)

6.67 10–7

(c)

6.67 10–8

(d)

6.67 10–5

1. A partical has an acceleration of 72 km/ min2 find acceleration in SI system.

(a)

0.5 m/ s2

(b)

30 m/ s2

(c)

18 m/ s2

(d)

20 m/ s2

1. 950 dyne = newton

(a)

9.5 10–3

(b)

95 10–5

(c)

950 10–7

(d)

9.5 10–4

62. 100 picometer = ...............

(a)10–8 cm (b)

10–7 m (c)

1010–6 m

(d)

1010–8 m

63. 100 walt hour = joule.

(a)

3.6 105 J

(b)

3.6 106 J

(c)

36 105 J

(d)

36 106 J

1. If x meter is a unit of length then area of 1m2 = ...............

(a) *x* (b) *x*2 (c) *x*–2 (d) *x*–1

1. 1 Mev = ev

(a)

107

(b)

104

(c)

105

(d)

106

1. Wave length of light radiation 0.000015 m = ...............
   1. 15 micron (b) 1.5 micron (c) 150 micron (d) 0.15 micron

67. 10 = ...............

(a) 600 '' (b) 3600 '' (c) 180 '' (d) 3600 '

68. 1 rad = ...............

 180 0   0

(a)

1800

3.140

(c)   

(d)

 180 

   

69. 1 g = amu

(a)

6.02 1023

(b)

6.02 10–23

1.66 10–27 (d)

1.66 1027

70. 1 parsec = ...............

(a)

10–15 m (b)

1.496 1011m

(c)

1.496 1015 m

3.08 1016 m

1. Which of the following unit does not represent the unit of power ?
   1. ampere/volt (c) (ampere)2  ohm

(c) joule/second (d) ampere  volt

1. Write the unit of angular acceleration in the SI system.
   1. N.Kg (b)

rad / (sec)2

(c) m/sec (d) N/kg

1. unit of universal gravitational constant is ...............

(a)

kg m sec–1

(b)

N m–1 sec (c)

N m2 kg–2

(d)

N m kg–1

74. The unit of stefen Boltzman constant (  ) is ...............

(a)

w2 m–2 k–1

(b)

w m2 k–3

(c)

w m–2 k4

(d)

w m–2 k–4

1. Unit of momentum physical quantity ?
   1. newton - second (b) newton/second (c) Jule (d) Jule/second
2. Light year is a unit of ...............
   1. Mass (b) volume (c) density (d) Distance
3. Joule/seed is the unit of ...............
   1. Work (b) angular momentum (c) Pressure (d) Energy
4. The SI unit of momentum is ...............
   1. kg  newton

kg m–2s2

kg m–1

kg ms–1

1. Volt/meter is the unit of ...............
   1. Work (b) viscosity (c) Electric fild intensity (d) velosity
2. The force F is represented by equation F = P is same as that of ...............

P𝑙1 + Q𝑙 , where 𝑙 is the length. The unit of

* 1. Surface tension (b) velocity (c) force (d) momentum

1. Write the unit of surface tension in SI system.
   1. N m2
   2. N m

dyne cm2

* 1. dyne

cm

1. Which physical quantity has unit of pascal - secod ?
   1. Velocity (b) viscocity (c) energy (d) coefficient of viscocity
2. Which physical quantity has unit of joule - second ?
   1. velocity (b) plank’s constant (c) energy (d) vescocity
3. What is the least count of vernier callipers ?

(a)

10–4 m (b)

10–5 m (c)

10–2 m (d)

10–3 m

1. What is the least count of screw gauge ?

(a)

10–4 m (b)

10–5 m (c)

10–2 m (d)

10–6 m

1. For measurement of astronomical distance is used.
   1. vernier callipers (b) spherometer (c) screwgauge (d) indirect method
2. Which mictoscope is used to measure the dimension of particle having dimension less than

4000 A0 ?

* 1. electron microscope (b) simple microscope (c) optical microscope (d) none of above

1. In electron microscope electron behave like ...............
   1. charge (b) mass (c) particles (d) wave
2. Which wave length of light is used in an optical microscope ?
   1. radiowave (b) X - ray (c) infrared (d) visible
3. The intercepted area of the spherical surface about the center is 0.25m2 having diameter 50 cm what will be solid angle ?

(a)

4 10–1 sr

(b)

1103 sr

(c)

10–1 sr (d)

5 10–1 sr

91. One planet is observed from two diametrically opposite point A and B on the earth the angle subtended at the planet by the two directions of observations is 1.8o. Given the diameter of

the earth to be about 1.276 107 m . What will be distance of the planet from the earth ?

(a)

40.06 108 m

(b)

4.06 108 m

(c)

400.6 1013 m

(d)

11108 m

92. Find the distance at which 4 AU would subtend an angle of exactly 1" of arc.

[1AU 1.496  1011m,1"  4.85  1016 rad]

(a)

1.123 105 m

(b)

11.23 105 m

(c)

1.123 1017 m

(d)

11.23 1017 m

1. The percentage error in the distance 100  5 cm is ...

(a) 5 % (b) 6% (c) 8 % (d) 20 %

1. In an experiment to determine the density of a cube the percentage error in the measurement of mass is 0.25 % and the percentage error in the measurement of length is 0.50 % what will be the percentage error in the determination of its density ?

(a) 2.75 % (b) 1.75 % (c) 0.75 % (d) 1.25 %

1. If



A  b4

b4

the fractional error in A is ...............

b

 b  4

(a)

(b) b

(c)

4 b 

(d) b

1. If

b

A2 B



P C3

 

where percentage error in A , B and C are respectively

2 %  3% and 5 %

then

total percentage error in measurement of p

(a)18 % (b) 14 % (c) 21 % (d) 12 %

1. In the experiment of simple pendulum error in length of pendulum (𝑙) is 5 % and that of g

is 3 % then find percentage error in measurement of periodic time for pendulum (a) 4.2 % (b) 1.2 % (c) 2 % (d) 4 %

1. Acceleration due to gravity is given by g  GM

R 2

what is the equation of the fractional error g / g

in measurement of gravity g ? [G & M constant]

(a)

– R

(b)

2 R

(c)

–2 R

(d) 1 R

R R R 2 R

𝑙

g

1. The period of oscillation of a simple pendulum is given by T  2

what is the equation of

the relative error

T in measurement of period T ?

T

(a) 1 𝑙

(b) 2 𝑙

(c) 1 𝑙

(d) 4 𝑙

2 𝑙 𝑙 4 𝑙 𝑙

1. The length of a rod is (10.15  0.06) cm what is the length of two such rods ?

(a) (20.30  0.06) cm

(b) (20.30  1.6) cm

(c) (10.30  0.12) cm

(d) (20.30  0.12) cm

1. For a sphere having volume is given by

V 4 r3

3

What is the equation of the relative error

V in measurement of the volume V ?

V

(a)

3 r r

(b)

4 r r

1. 4 r

3 r

p2

1. 1 r

3 r

1. Kinetic energy K and linear momentum P are related as

K  . What is the equation of the

2m

relative error k

k

in measurement of the K ? (mass in constant)

p

* 1. p

2 p p

p

* 1. 2p

4 p p

1. Heat produced in a current carrying conducting wire is H = I2Rt it percentage error in I, R and t is 2 % , 4 % and 2 % respectively then total percentage error in measurement of heat energy ...............

(a) 8 % (b) 15 % (c) 5 % (d) 10 %

1. The resistance of two resistance wires are

R1 (100  5) and

R 2 (200  7) are connected

in series. find the maximum absolute error in the equivalent resistance of the combination. (a) 35  (b) 12  (c) 4  (d) 9 

1. The periodic time of simple pendulum is T  2 relative error in the measurement of T and

𝑙

g

𝑙 are a

and

b respectively find relative error in the measurement of g

* 1. *a + b* (b) *2b + a* (c) *2a + b* (d) *a - b*

1. A physical quantity x is given by x = maximum percentage error in x

1

A4 B4

C3D4 3

due to which physical quantgity produced the

* 1. B (b) C (c) A (d) D

1. The resistance

error in R.

R  V

I

where V 100  5 volts and I  10  0.3 anperes calculate the percentage

(a) 8 % (b) 10 % (c) 12 % (d) 14 %

1. The number of significant figures in 0.000150 is ...............

(a) 3 (b) 5 (c) 2 (d) 4

1. Which of the following numerical value have significant figure 4 ?

(a) 1.011 (b) 0.010 (c) 0.001 (d) 0.100

1. What is the number of significant figures in 5.50 103 ?

(a) 2 (b) 7 (c) 3 (d) 4

1. The mass of substance is 75.5 gm and its volume is 25 cm2. It’s density up to the correct significant figure is ...............

(a)

3.02 gm/ cm3

(b)

3.200 gm/ cm3

(c)

3.02 gm/ cm3

(d)

3.1 gm/ cm3

1. The area of a rectangle of size 1.25  2.245 cm in significant figure is ...............

(a)

2.80625 cm2

(b)

2.81 cm2

(c)

2.806 cm2

(d)

2.8062 cm2

1. The significant figures in 500.5000 are ...............

(a) 5 (b) 3 (c) 7 (d) 6

1. Addition of measurement 15.225 cm, 7.21 cm and 3.0 cm in significant figure is ...............

(a) 25.43 cm (b) 25.4 cm (c) 25.435 cm (d) 25.4350 cm

1. Substract 0.2 J from 7.36 J and express the result with correct number of significant figures. (a) 7.160 J (b) 7.016 J (c) 7.16 J (d) 7.2 J
2. After rounding of the number 9595 to 3 significant digits the value becomes ...............

(a) 9600 (b) 9000 (c) 9590 (d) 9500

1. How many significant numbers are there in (2.30  4.70) 105 ?

(a) 3 (b) 4 (c) 2 (d) 5

1. The radius of circle is 1.26 cm. According to the concept of significant figures area of it can be represented as -

(a)

4.9850 cm2

(b)

4.985 cm2

(c)

4.98 cm2

(d)

9.98 cm2

1. If A = 3.331 cm B = 3.3 cm then with regard to significant figure A + B = ...............

(a) 6.6 cm (b) 6.31 cm (c) 6.631 cm (d) 6 cm

1. If the length of rod A is (2.35  0.01) cm

longer than rod A by ...............

and that of B is (5.68  0.01) cm

then the rod B is

(a) (2.43  0.00) cm

(b) (3.33  0.02) cm

(c) (2.43  0.01) cm

(d) (2.43  0.001) cm

1. In acceleration, The dimensions for mass ............... for length .. and for time

(a) 0,1,–2 (b) 1,0,–2 (c) –2,0,1 (d) –2,1,0

1. Dimensional formula for power is ...............

(a)

M2L–2T–3

(b)

M1L2T–2

(c)

M1L3T–1

(d)

M0L2T–2

1. Dimensional formula for calories is ...............

(a)

M1L1T–2

(b)

M2L1T–2

(c)

M1L2T–2

(d)

M2L2T–2

1. Dimensional formula for thermal conductivity (k) is ..

(a)

M2L1T–2K–1

(b)

M1L1T–2K1

(c)

M1L0T–3K–1

(d)

M1L1T–3K–1

1. Dimensional formula for Resistance (R) is ...............

(a)

M1L1T–3A–1

(b)

M1L1T0A–1

(c)

M1L2T–3A–2

(d)

M1L0T–3A–1

1. Dimensional formula for conductance is ...............

(a)

M–1L2T–3A2

(b)

M1L2T–2A1

(c)

M1L–2T3A2

(d)

M–1L–2T3A2

1. Which physical quantity is represented by

M1L3T–3A2 ?

* 1. Resistivily (b) Resistance (c) conductance (d) conductivity

1. Which physical quantity is represented by

M–1L–3T3A2 ?

* 1. Resistivity (b) Resistance (c) conductance (d) conductivity

1. Which physical quantity is represented by

M1L1T–3A–1 ?

* 1. Stress (b) Resistance (c) Electricfield (d) potential Difference

1. The dimensional formula of plank’s constant is ...............

(a)

M3L2T–1

(b)

M1L2T–1

(c)

M2L1T–1

(d)

M1L2T–3

1. Dimensional formula of latent heat is ...............

(a)

M0L2T–2

(b)

M2L0T–2

(c)

M1L2T–1

(d)

M2L2T–1

1. Dimensions of impulse are.

(a)

M–1L–1T1

(b)

M1L1T–1

(c)

M1L1T1

(d)

M1L2T–2

1. Write dimensional formula of coefficient of viscosity

(a)

M1L2T–1

(b)

M–1L1T1

(c)

M1L–1T–1

(d)

M1L1T–1

1. Dimensional formula for torque is

(a)

M2 L2T–3

(b)

M2L1T–2

(c)

M1L1T–2

(d)

M1L2T–2

1. Dimensional formula for capisitance (C)

(a)

M–1L–2T4A2

(b)

M1L–2T4A2

(c)

M–1L–2T3A1

(d)

M3L1T–1A–2

1. Dimensional formula for Boltzmann’s constant is ...............

(a)

M1L1T–2K–1

(b)

M2L1T–2K–1

(c)

M1L2T–2K–1

(d)

M2L2T1K–2

1. Dimensional formula for electromotive force (emf)

(a)

M2L1T–1K–3

(b)

M1L2T–3K–1

(c)

M1L1T–3K–1

(d)

M1L2T3K–1

1. Which physical quantity has dimensional formula as CR where C - capisitance and R - Resistance ?
   1. Frequency (b) current (c) Time period (d) acceleration
2. Write the dimensional formula of the ratio of linear momentum to angular momentum.

(a)

M0L–1T0

(b)

M1L1T0

(c)

M0L1T0

(d)

M0L1T1

1. If L and R are respesented as the inductance and resistance respectively then the dimensional

formula of R

L

will be ...............

(a)

M–2L1T–2A1

(b)

M0L0T–1A0

(c)

M1L–1T0A1

(d)

M1L3T1A0

1. Write the dimensional formula of r.m.s (root mean square) speed.

(a)

M1L2T–2

(b)

M0L2T–2

(c)

M0L1T–1

(d)

M1L0T–1

1. One physical quantity represented by an equation as then quantity is ..

 (p – q)c 2

where p, q and c are length

* 1. length (b) velocity (c) Area (d) volume

1. The dimensional formula of magnetic flux is ...............

(a)

M1L2T–2A–1

(b)

M1L2T1A2

(c)

M1L2T–2A2

(d)

M–1L–2T1A2

1. Which physical quantity has unit of pascal - second ?
   1. Force (b) Energy (c) Coefficient of viscocity (d) velocity
2. Dimensional formula of CV ? where C - capacitance and V - potential different

(a)

M1L–2T4A2

(b)

M1L2T–3A1

(c)

M0L0T1A–1

(d)

M0L0T1A1

1. The equation of a wave is given by Y  A sin   *x* – *k* 

where  is the angular velocity and

 *v* 

*v* is the linear velocity. Write the dimensional formula of K

(a)

M0L0T1

(b)

M1L0T–1

(c)

M0L1T1

(d)

M1L–1T1

1. If P and q are diffrent physical quantities then which one of following is only possible dimensionaly ?

p

* 1. p + q (b) q (c) p – q (d) p = q

1. From  p  a  v – b  constant equation is dimensionally correct find the dimensional formula

 v2 

 

for b ? where P = preasure V = volume

(a)

M0L3T0

(b)

M1L3T0

(c)

M0L1T3

(d)

M1L1T–1

1. Pressure P = A cosBx + c sinDt where xin meter and t in time then find dimensional formula

of D B

(a)

M1L1T–1

(b)

M0L1T–1

(c)

M1L1T0

(d)

M–1L0T1

1. Find the dimensional formula for energy per unit surface area per unit time

(a)

M1L0T–2

(b)

M0L1T–1

(c)

M1L0T–3

(d)

M1L–1T1

1. Equation of force of b.

F  at  bt2

where F is force in Newton t is time in second, then write unit

(a)

Nm–1

at2

(b)

Nm2

(c) Nm (d)

Nm–2

a

1. Pressure P 

bx

where x = distance, t= time find the dimensional formula for b

(a)

M1L0T–4

(b)

M1L1T–1

(c)

M1L0T–2

(d)

M1L0T–2

153.

F  A (1 – e–Bxt2 )

where F is force and x is desplacement. write the dimension formula of B

(a)

0

M2L1T–1

(b)

M0L–1T–2

(c)

M1L0T–2

(d)

M1L2T–1

154. Equation of physical quantity *v*  at  bt2

formula of a in this equation

where *v* = velocity t = time so write the dimensional

(a)

M0L1T–1

(b)

M1L1T–1

(c)

M0L1T–2

(d)

M1L2T0

1. Density of substance in CGS system is 3.125

gm / cm3

what is its magnitude is SI system ?

(a) 0.3125 (b) 3.125 (c) 31.25 (d) 3125

1. The resistivity of resistive wire is

  AR

L

where L = length of wire A = Area of wire and

R is resistance of wire find dimension formula of 

(a)

M1L3T–3A–2

(b)

M1L2T–3A–2

(c)

M2L3T1A2

(d)

M2L3T–3A–2

1. A cube has numerically equal volume and surface area calculate the volume of such a cube.
   1. 2000 Unit (b) 216 Unit (c) 2160 Unit (d) 1000 Unit
2. Which out of the following is dimensionally correct.
   1. *p*2 = *h**g* (b) *p* = *h*2*g* (c) *p* = *h**g* (d) *p* = *h*2*g*
3. If energy

E  Gphqcr

where G is the universal gravitational constant. h is the plank’s constant

and c is the velocity of light, then the values of p, q and r are respectively

(a)

1 1 5

– , ,

2 2 2

(b)

1 1 5

, ,

2 2 2

(c)

5 1 1

, , –

2 2 2

(d)

1 1 5

, – ,

2 2 2

1. If the centripetel force is of the form ma*v*brc find the values of a, b and c

(a) 1,2,1 (b) 1,2,–1 (c) 1,3,–2 (d) –1,3,–1

1. equation of 𝑙*t*  𝑙0[1   (*T*2 – *T*1)] find out the dimensions of the coefficient of linear expansion

 suffix.

(a)

M0L0T1K1

(b)

M0L1T1K1

(c)

M1L1T0K1

(d)

M0L0T0K–1

1. Test if the following equation are dimensionally correct (S = surface tension  = density P = pressure v = volume n = coefficient of viscocity r = redious)

(a)

h  2Scos

rg

(b) v 

(c)

pr4t

v  8n𝑙 (d) all correct

1. Match list - I with list - II

p



List - I List - II

* 1. Joule (a) henry  ampere/sec
  2. Walt (b) coulomb  volt
  3. volt (c) metre  ohm
  4. Resistivity (d) (ampere)2  ohm
     1. b,d,c,a (b) c,a,b,d (c) b,d,a,c (d) b,c,a,d

1. Match column - I with column - II

Column -I Column - II

* 1. capacitance (a)
  2. Electricfield (b)
  3. planck’s constant (c)
  4. Angular momentum (d)

M1L1T–3A–1

M1L2T–1 M–1L–2T4A2 M1L2T–1

* + 1. a,c,b,d (b) c,a,d,b (c) c,a,b,d (d) a,b,d,c

1. In the relation

P  



– *z*

e *kB*  ,

P is pressure, z is distance, k is boltz mann constant and  is

the temperature. The dimensional formula of B will be

(a)

M0L2T0

M1L0T1

M1L1T–1

M1L1T0

# KEY NOTE

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1(B) | 26(B) | 51(D) | 76(D) | 101(A) | 126(D) | 151(D) |
| 2(C) | 27(B) | 52(A) | 77(B) | 102(B) | 127(A) | 152(A) |
| 3(C) | 28(A) | 53(B) | 78(D) | 103(D) | 128(D) | 153(B) |
| 4(A) | 29(C) | 54(A) | 79(C) | 104(B) | 129(C) | 154(C) |
| 5(B) | 30(B) | 55(B) | 80(A) | 105(C) | 130(B) | 155(D) |
| 6(B) | 31(A) | 56(A) | 81(B) | 106(C) | 131(A) | 156(A) |
| 7(C) | 32(B) | 57(A) | 82(D) | 107(A) | 132(B) | 157(B) |
| 8(B) | 33(A) | 58(B) | 83(B) | 108(A) | 133(C) | 158(C) |
| 9(A) | 34(B) | 59(C) | 84(A) | 109(A) | 134(C) | 159(A) |
| 10(C) | 35(C) | 60(D) | 85(B) | 110(C) | 135(D) | 160(B) |
| 11(A) | 36(B) | 61(A) | 86(D) | 111(D) | 136(A) | 161(D) |
| 12(D) | 37(A) | 62(C) | 87(A) | 112(B) | 137(B) | 162(D) |
| 13(D) | 38(A) | 63(A) | 88(D) | 113(C) | 138(C) | 163(C) |
| 14(B) | 39(C) | 64(C) | 89(D) | 114(B) | 139(A) | 164(B) |
| 15(D) | 40(D) | 65(D) | 90(A) | 115(D) | 140(B) | 165(B) |
| 16(D) | 41(C) | 66(A) | 91(B) | 116(C) | 141(C) |  |
| 17(B) | 42(B) | 67(B) | 92(C) | 117(A) | 142(C) |  |
| 18(C) | 43(A) | 68(C) | 93(A) | 118(C) | 143(A) |  |
| 19(A) | 44(C) | 69(A) | 94(B) | 119(A) | 144(C) |  |
| 20(B) | 45(D) | 70(D) | 95(C) | 120(B) | 145(D) |  |
| 21(B) | 46(D) | 71(A) | 96(C) | 121(A) | 146(A) |  |
| 22(C) | 47(B) | 72(B) | 97(D) | 122(B) | 147(B) |  |
| 23(D) | 48(D) | 73(C) | 98(B) | 123(C) | 148(A) |  |
| 24(A) | 49(A) | 74(D) | 99(A) | 124(D) | 149(B) |  |
| 25(B) | 50(B) | 75(A) | 100(D) | 125(C) | 150(C) |  |

Strong nuclear force

1. Electronmagnaticforce

1

= 102

**HINT**

91

= 102

  1.80  0.01  rad b  1.27 107 m

Strong nuclear force

1. Weak nuclear force

1

= 10-13

= 1013

D  b  4.06 108 m



Electronmagnetic force

1. Gravational force =

10-2

10-38

= 1036 94

density( ) = mass( m)

volume( l3 )

F  kq1q2

kq' q'

F  1 2

percentage error in density

41 1 r2

2 r2

M l

1 2 = [ + 3 ] 100

M  l 

10 10–6

49 10–9

–15

104

 

= 1.75 %

A2 B

10  10–8

58

100 10–9

96 P 

C3

60 72 *km* 

(min)2

72  1000

3600

 20 *m*

(sec)2

P %  [2 A  B  3 C] P A B C

= 21 %

l

g

64 Area =

𝑙2

A = x2m2

97 T  2

1 m2  A  1

 x–2

T 1

l 1 g

x2

69 1 amu =

x2

1.66 10–27 kg

100  [   

T 2 l 2

= 4 %

]100

g

= 1.66 10–24 gm

100 length of two rods  2l

1gm  6.023 1023 amu

80 F  p𝑙1  q𝑙–1

p𝑙|1  F

P  F  N(Neuton)  surface tension

𝑙 𝑙(meter)

90 A  0.025 m2

2r  0.5m

Solid angle = A  0.4 Sr

r2

= 4 10–1 Sr

103

105

= 2(10.15  0.06)

= (20.30  0.12) cm

heat energy H = I2RT

H 100  [2 I  R  T] 100 H I R T

= 10 %

g  42 *l*

T2

g  l  2  T g l T

= b + 2q

107

Resis tan ce R V

148

 P  a  (v – b)  cons tan t

I  v2 

R  V  I R V I

R  5  0.3

R 100 10

 

PV – Pb 

PV – Pb

*a* – *ab v v*2

 constant

R  8

R 100

R %  8% R

V  b  M0L3T0

149 cos Bx  dimensionl less

Bx  M0L0T0

M0L0T0 0 –1 0

111

density = mass  75.5

volume 25

B   M L T

X

= 3.02 = 3.1 g / cm3

Same as

D  M0L0T–1

128

129

Resistivity  Resis tan ce  Area

length

Electricfield  force

electric ch arg e

mass  (dis tan ce)2

 D  M0L1T–1

B

151 F  at  bt2

F  bt2  at

130

plank 's cons tan t 

time

b  F  N

131

latent heat(Q) =

heat energy

t2 m2

133

mass

coefficientof viscosity  Force  time

153

F  A (1 – e– Bxt2 )

2

(length)2

Bxt  dimensional less

M0L0T0 0 –1 –2

1. Urms   root mean square speed

B  xt2  M L T

1. If *p = q = c* = L

u2

then *(p - q)c* = L2 = Area

d*v*

155

Density = 3.125  gm

cm3

144

If F = nA

dx

3.125 10–3 kg

= 10–6 m3

n =

F =

*A* d*v*

pascal second

= 3125

kg / m3

146

dx

y  A sin  x

( – k)

*v*

 x  k

*v*

157

volume of cube V  a3

total surface area of cube A = 6a2

V  A

a3  6a2

a  6

x 0 0 1

k   M L T

*v*

V  (6)3  216 unit

159

E  GPhqcr

E  M1L2T–2

165

z kB

 M0L0T0

G  M–1L3T–2

h  M1L2T–1

  kB

z

uand P = 



c  M0L1T–1 take it

(M1L2T–2 )  (M–1L3T–2 )p (M1L2T–1)q

(M0L1T–1 )c

   

p

 M0L2T0

kB pz

= M–pqL3p2qrT–2p–q–r

160

P  1 , q  1 , r  5

2 2 2

F  ma *v*brc F  M1L1T–2 *v* M0L1T–1 r  M0L1T0

m  M1L0T0 take it

(M1L1T–2 )  (M1)a (L1T–1)b (L1)c

= Ma LbcT– b

a  1, b  2, c  –1