

India's Number 1 Education App

PHYSICS

BOOKS - DISHA PHYSICS (HINGLISH)

PHYSICAL WORLD, UNITS & DIMENSION



1. L,C and R represent the physical quantities

inductance, capacitance and resistance

combinations have dimensions of frequency?

A.
$$\frac{1}{RC}$$

B. $\frac{R}{L}$
C. $\frac{1}{\sqrt{LC}}$
D. $\frac{C}{L}$

Answer:

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2. The number of particles is given by $n = -D \frac{n_2 - n_1}{x_2 - x_1}$ crossing a unit area perpendicular to X - axis in unit time, where n_1 and n_2 are particles per unit volume for the value of x meant to x_2 and x_1 . Find the dimensions of D called diffusion constant.

A. $\left[M^0 L T^2\right]$

- B. $\left[M^0L^2T^{-4}
 ight]$
- $\mathsf{C}.\left[M^{0}LT^{\,-3}\right]$

D. $\left[M^0L^2T^{-1}
ight]$



3. In the formula $X = 3YZ^2$, X and Z have dimensions of capacitance and magnetic induction respectively . When are the dimensions of Y in MLTQ system ?

A.
$$\left[M^{-3}L^{-2}T^{-4}A^{-1}
ight]$$

 $\mathsf{B.}\left[ML^{-2}\right]$

C.
$$\left[M^{-3}L^{-2}T^4A^4
ight]$$

D.
$$\left[M^{-3}L^{-2}T^{8}A^{4}\right]$$

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4. In the relation $p = \frac{a}{\beta}e^{\frac{aZ}{k\theta}}$, p is pressure Z is distance .k is Boltzman constant and θ is the temperature . The dimensional formula of β will be

A.
$$\left[M^0L^2T^0
ight]$$

$$\mathsf{B.}\left[M^1L^2T^1\right]$$

C.
$$\left[M^1L^0T^{\,-1}
ight]$$

D.
$$\left[M^0L^{32}T^{\,-1}
ight]$$

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5. The frequency of vibration of string is given

by
$$v=rac{p}{2l}iggl[rac{F}{m}iggr]^{1/2}$$
. Here p is number of

segment is the string and l is the length. The

dimension formula for m will be

A.
$$\left[M^0LT^{\,-1}
ight]$$

- B. $\left[ML^0T^{\,-1}
 ight]$
- $\mathsf{C}.\left[ML^{-1}T^0\right]$
- D. $\left[M^0L^0T^0\right]$

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6. Convert Newton into dyne.

A. 1 dyne
$$\,=\,10^5\,$$
 newton

B.1 dyne $= 10^{-7}$ newton

C. 1 dyne
$$= 10^5$$
 newton

D. 1 dyne $= 10^7$ newton

Answer:

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7. If the velocity of light (c), gravitational constant (G), and Planck's constant (h) are chosen as fundamental units, then find the dimensions of mass in new system.

A.
$$G^{rac{1}{2}}h^{rac{1}{2}}c^{-rac{5}{2}}$$

B. $G^{-rac{1}{2}}h^{rac{1}{2}}c^{rac{1}{2}}$
C. $G^{rac{1}{2}}h^{rac{1}{2}}c^{-rac{3}{2}}$
D. $G^{rac{1}{2}}h^{rac{1}{2}}c^{rac{1}{2}}$



8. If the constant of gravitation (G) , Planck's constant (h) and the velocity of light (c) be

chosen as fundamental units. The dimension

of the radius of gyration is

A.
$$h^{rac{1}{2}}c^{-rac{3}{2}}G^{rac{1}{2}}$$

B. $h^{rac{1}{2}}c^{rac{3}{2}}G^{rac{1}{2}}$
C. $h^{rac{1}{2}}c^{-rac{3}{2}}G^{-rac{1}{2}}$
D. $h^{-rac{1}{2}}c^{-rac{3}{2}}G^{rac{1}{2}}$

Answer:

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9. A physical quantity which has a direction:-

A. (a) depends on the method of measurement B. (b) does not depend on the method of measurement C. (c) is more in SI system than in CGS system D. (d) directly proportional to the fundamental units of mass, length and

time

Answer:

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10. The unit of Stefan's constant σ is

A.
$$Wm^{-2}K^{-1}$$

B.
$$Wm^2K^{-4}$$

C.
$$Wm^{-2}K^{-4}$$

D.
$$Wm^{-2}K^4$$



11. In $S = a + bt + ct^2$. S is measured in metres and t in seconds. The unit of c is

A.
$$ms^{-2}$$

B.m

C. ms^{-1}

D. None





12. Wavelength of ray of light is 0.00006 m. It is equal to

A. 6 microns

B. 60 microns

C. 600 mocrons

D. 0.6 mocrons



13. The unit of permittivity of free space ε_0 is:

A.
$$C^2 m^2 N^{-2}$$

B.
$$C^{\,-1}m^2N^{\,-2}$$

C.
$$C^2 m^2 N^{-2}$$

D.
$$C^2m^{-2}N^{-1}$$



14. The dimension of
$$\left(rac{1}{2}
ight)arepsilon_0 E^2$$
 ($arepsilon_0$:

permittivity of free space, E electric field

A. $MLT^{\,-1}$

B. $ML^2T^{\,-2}$

C. $ML^{-1}T^{-2}$

D. $ML^2T^{\,-1}$





15. Which of the following pairs is wrong

A. (a) Pressure-Baromter

B. (b) Relative density-Pyrometer

C. (c) Temperature-Thermometer

D. (d) Earthquake-Seismograph

Answer:

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16. A physical quantity x depends on quantities y and z as follows : $x = Ay + B \tan(Cz)$, where A, B and C are constants. Which of the followings do not have the same dimensions?

A. (a) x and B

- B. (b) C and z^{-1}
- C. (c) y and B/A
- D. (d) x and A

17. If the time period (T) of vibration of a liquid drop depends on surface tension (S), radius(r) of the drop , and density (ρ) of the liquid , then find the expression of T.

A.
$$T=k\sqrt{
ho r^3/s}$$

B.
$$T=k\sqrt{
horac{r^1}{2}r^3/s}$$

C.
$$T=k\sqrt{
ho r^3/S^{1/2}}$$

D. None of these





19. Dimensions of permeability are

A.
$$\left[MLT^{\,-2}
ight]^2$$

B.
$$\left[MLT^{\,-2}
ight]^{\,-2}$$

C.
$$\left[MLT^{\,-1}T^{\,-2}
ight]^2$$

D.
$$\left[MLT^{\,-1}T_{-2}
ight]^{\,-2}$$

20. 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.
$$v_T \propto rac{\eta r}{mg}$$

B. $v_T \propto \eta rmg$

C.
$$v_T \propto rac{mgr}{\eta}$$

D.

Answer:



21. The van der Waal's equation of state for

some gases can be expressed as :

$$ig(P+rac{a}{V^2}ig)(V-b)=RT$$

Where P is the pressure , V is the molar volume , and T is the absolute temperature of the given sample of gas and a, b, and R are constants.

The dimensions of a are

A.
$$ML^5T^{-2}$$

B. $ML^{-1}T^{-2}$
C. $ML^0L^3T^0$
D. $ML^0L^6T^0$



22. The frequency f of vibrations of a mass m suspended from a spring of spring constant k is given by $f = Cm^x k^y$, where C is a dimensionnless constant. The values of x and y are, respectively,

A.
$$x=rac{1}{2}$$

B. $x=-rac{1}{2}$

C.
$$x=-rac{1}{2}$$

D. $y=rac{1}{2}$



23. If P represents radiation pressure, c represents the speed of light and q represents the radiation energy per unit area per second, then calculate non - zero integres such that $p^{x}q^{y}c^{z}$ is dimensionless.

A. x=1

B. y=-1

C. z=1

D. x=-1

Answer:



24. Which of the following pairs have same dimensions ?

A. Angular momentum and work

B. Torque and work

C. Energy and Yong's modulus

D. Light year and wavelength

Answer:

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25. Find a combination of these threeconstants that has the dimensions of time.This time is called the Planck time and

represents the age of the universe before which the laws of physics as presently understood cannot be applied.

A.
$$\sqrt{\frac{hG}{c^4}}$$

B. $\sqrt{\frac{hG}{c^3}}$
C. $\sqrt{\frac{hG}{C}}$
D. $\sqrt{\frac{hG}{c^5}}$



26. Find the value of Planck time in seconds

A.
$$1.3 imes10^{-33}s$$

B. $1.3 imes10^{-43}s$
C. $2.3 imes10^{-13}s$
D. $0.3 imes10^{-23}s$



- 27. The energy of a photon is given by E $= \frac{hc}{\lambda}$
- If $\lambda = 4 imes 10^{-7}$)m,the energy of photon is
 - A. 3.0 eV
 - B. 4.5 ev
 - C. 2.10 eV
 - D. 3.95 eV



28. Assertion : Units of Rydberge constant R are m^{-1} .

Reason : It follows from Bohr's formula $\left[\overline{V}=R\left(rac{1}{n_1^2}-rac{1}{n_2^2}
ight)
ight],$ where the symbole

have their usual meaning.



29. Assertion : The time period of a pendulum is given by the formula, $T = 2\pi \sqrt{g/l}$. Reason : According to the principle of homogeneity of dimensions, only that formula

is correct in which the dimensions of L.H.S. is

equal to dimensions of R.H.S.

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30. Assertion : L/R and CR both have same

dimensions

Reason L/R and CR both have dimensions

of time

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