



PHYSICS

BOOKS - SAI PHYSICS (TELUGU ENGLISH)

PHYSICAL WORLD AND UNITS OF MEASUREMENTS

Mcq

1. Force F is given by the equation $F = X$

/Linear density Then dimension of X are

A. $M^2 L^0 T^{-2}$

B. $M^0 L^0 T^{-1}$

C. $L^2 T^{-2}$

D. $M^0 L^2 T^{-2}$

Answer: A



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2. The pressure on a circular plate is measured by measuring the force on the plate and the radius of the plate. If the errors in measurement of the force and the radius are 5% and 3% respectively, the percentage of error in the measurement of pressure is

- A. 8
- B. 14
- C. 11
- D. 12

Answer: C



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3. If C the velocity of light, h Planck's constant and G gravitational constant are taken as fundamental quantities, then the dimensional formula of mass is

A. $h^{-1/2}G^{1/2}C^0$

B. $h^{1/2}C^{1/2}G^{-1/2}$

C. $h^{-1/2}C^{1/2}G^{-1/2}$

$$D. h^{-1/2} C^{-1/2} G^{-1/2}$$

Answer: B



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4. If E , M , J and G respectively denote energy, mass angular momentum and universal gravitational constant, the quantity, which has the same dimensions as the dimensions of

$$\frac{EJ^2}{M^5G^2}$$

A. Time

B. Angle

C. Mass

D. Length

Answer: B



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5. The dimensional formula of $\frac{1}{2}\mu_0 H^2$ ($\mu_0 =$ permeability of free space and $H =$ magnetic field intensity) is

A. $[MLT^{-1}]$

B. $[ML^2T^{-2}]$

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

D. $[ML^2T^{-1}]$

Answer: C



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6. If the force is given by $F = at + bt^2$ with t as time. The dimensions of a and b are

A. $[MLT^{-4}]$, $[MLT^{-2}]$

B. $[MLT^{-3}]$, $[MLT^{-4}]$

C. $[ML^2T^{-3}]$, $[ML^2T^{-2}]$

D. $[ML^2T^{-3}]$, $[ML^3T^{-4}]$

Answer: B



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7. When a wave traverses a medium, the displacement of a particle located at x at a time t is given by $y = a \sin (bt - cx)$, where a , b

and c are constants of the wave, which of the following is a quantity with dimensions?

A. y/a

B. bt

C. cx

D. b/c

Answer: D



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8. The Energy (E), Angular momentum (L) and Universal gravitational constant (G) are chosen as fundamental quantities. The dimensions of universal gravitational constant in the dimensional formula of Plank's constant (h) is

A. Zero

B. -1

C. $\frac{5}{3}$

D. 1

Answer: A



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9. Some physical constants are given in Column I and their dimensional formulae are given in Column II. Match the following Columns and Choose the correct answer.



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10. If C, R, L and I denote Capacity, Resistance, Inductance and Electric current respectively, the quantities having the same dimensions of time are

(i) CR (ii) $\frac{L}{R}$

(iii) \sqrt{LC} (iv) LI^2

A. (1) and (2) only

B. (1) and (3) only

C. (1) and (4) only

D. (1),(2) and (3) only

Answer: D



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11. Names of units of some physical quantities are given in column I and their dimensional formulae are given in column II. Match the following columns and choose the correct answer.



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12. 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

A. $[M^0 L T^0]$ and $[M^0 L^0 T^{-1}]$

B. $[M^0 L T^{-1}]$ and $[M^0 L T^{-2}]$

C. $[M^0 L T^{-1}]$ and $[M^0 L^0 T]$

D. $[M^0 L T^{-1}]$ and $[M^0 L^0 T^{-1}]$

Answer: D



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13. In planetary motion the areal velocity of position vector of a planet depends on angular velocity (ω) and the distance of the planet from sun (r). If so the correct relation for areal velocity is

A. $d \frac{A}{dt} \propto \omega r$

B. $d \frac{A}{dt} \propto \omega^2 r$

C. $d \frac{A}{dt} \propto \omega r^2$

D. $d \frac{A}{dt} \propto \sqrt{\omega r}$

Answer: C



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14. The vander waal's equation for a gas is $\left(p + \frac{a}{V^2}\right)(V - b) = nRT$ where p , V , R , T and n represent the Pressure, Volume, universal gas constant, absolute temperature and number of moles of a gas respectively, where a and b are constants. The ratio $\frac{b}{a}$ will have the following dimensional formula

A. $[M^{-1}L^{-2}T^2]$

B. $[M^{-1}L^{-1}T^{-1}]$

C. $[ML^2T^2]$

D. $[MLT^{-2}]$

Answer: A



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15. In the measurement of a physical quantity

$$X = A^2 \frac{B}{C^{1/3}} D^3$$

The percentage errors

introduced in the measurement of the

quantities A, B, C and D are 2%, 2%, 4% and 5% respectively. Then, the minimum amount of percentage error in the measurement of X is contributed by

A. A

B. B

C. C

D. D

Answer: C



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16. In CGS system the magnitude of the force is 100 dyne. In another system where the fundamental physical quantities are kilogram, metre and minute, the magnitude of the force is

A. 0.036

B. 0.36

C. 3.6

D. 36

Answer: C



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17. In an experiment of simple pendulum, the errors in the measurement of length of the pendulum (L) and time period (T) are 3% and 2% respectively. The maximum percentage errors in the value of $\frac{L}{T^2}$ is

A. 0.05

B. 0.07

C. 0.08

D. 0.01

Answer: B



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18. The fundamental physical quantities that have same dimensions in the dimensional formula of torque and Angular momentum are

A. Mass, Time

B. Mass, Length

C. Time, Length

D. Time, Mole

Answer: C



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19. If pressure P , velocity V and Time T are taken as fundamental physical quantities the dimensional formula of the force is

A. PV^2T^2

B. $P^{-1}V^2T^{-2}$

C. PVT^2

D. $P^{-1}VT^2$

Answer: A



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20. The dimensional formula for Latent heat is

A. $[MLT^{-2}]$

B. $[ML^2T^{-2}]$

C. $[M^0L^2T^{-2}]$

D. $[MLT^{-1}]$

Answer: C



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21. The SI unit of Moment of inertia is

A. kgm^{-2}

B. kgm^2

C. Nm^{-2}

D. Nm^2

Answer: B



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22. Dimensions of ohm are same as (h = Planck's constant, e = charge)

A. $\frac{h}{e}$

B. $\frac{h^2}{e}$

C. $\frac{h}{e^2}$

D. $\frac{h^2}{e^2}$

Answer: C



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23. If M, L, T and I stand for Mass, Length, Time and electric current respectively, the dimensional formula for Capacitance is

A. $[M^{-1}L^2T^{-4}I^2]$

B. $[M^{-1}L^{-2}T^4I^2]$

C. $[ML^2T^4I^2]$

D. $[ML^2T^{-4}I^{-2}]$

Answer: B



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24. Which of the following has no dimensions?

A. Angular velocity

B. Momentum

C. Angular momentum

D. Strain

Answer: D



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25. The dimensions of Resistance \times

Capacitance are same as for

A. Frequency

B. Energy

C. Time period

D. Current

Answer: C



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26. The velocity of a body falling freely under gravitational field varies as $g^p h^q$, where g is gravitational acceleration and h is height from which the body is released. p and q are given by

A. $p = 2, q = 1/2$

B. $p = 1/2, q = 1/2$

C. $p = 1/2, q = 1$

D. $p = q = 1$

Answer: B



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27. The following physical quantities has a ratio of 10^3 between its SI units and CGS units

A. Universal gravitational constant

B. Boltzmann's constant

C. Planck's constant

D. Young's modulus of elasticity

Answer: A



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28. The ratio L/R , where L and R stand for Inductance and Resistance, has the same dimensions as those of

A. Velocity

B. Acceleration

C. Time

D. Force

Answer: C



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29. The pair of physical quantities not having the same dimensional formula is

A. Acceleration, Gravitational field strength

B. Torque, Angular momentum

C. Pressure, Modulus of elasticity

D. All of the above

Answer: B



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30. If the period t of a drop of liquid of density d vibrating under surface tension s is given by

the formula $t = \sqrt{d^a r^b s^c}$ where r is radius of drop. a =1 and c = -1, the value of b is

A. 3

B. -3

C. -4

D. 4

Answer: A



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31. On heating, the length of the side of cube changes by 2%. The volume of the cube changes by

A. 0.01

B. 0.06

C. 0.005

D. 0.03

Answer: B



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32. The dimensional formula of the Universal constant of gravitation is

A. $[M^0 L^{-3} T^{-2}]$

B. $[ML^{-3} T^2]$

C. $[M^{-1} L^3 T^{-2}]$

D. $[M^2 L^2 T^2]$

Answer: C



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33. The pair of physical quantities not having the same dimensional formula is

A. Energy and torque

B. Torque and entropy

C. Entropy and power

D. Power and angular momentum

Answer: A



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34. Siemen is the SI unit for

A. Electrical resistivity

B. Electrical conductance

C. Electrical permittivity

D. Electrical capacitance

Answer: B



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