UNIT AND DIMENSION DPP-1

Q.1 Write the dimensions of a/b in the relation $P = \frac{a - t^2}{bx}$, where P is the pressure, x is the distance and t is the time.

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

Q.2 A liquid drop of density ρ, radius r and surface tension σ oscillates with time period T. Which of the following expressions for T^2 is correct?

(A) $\frac{\rho r^3}{\sigma}$ (B) $\frac{\rho\sigma}{r^3}$ (C) $\frac{r^3\sigma}{\rho}$ (D) None of these

Q.3 The position x of a particle at time t is given by $x = \frac{V_0}{a}(1 - e^{-at})$, where V_0 is constant and $a > 0$. The dimensions of V_0 and *a* respectively are -

(A) M^0LT^{-1} and T^{-1} (B) M^0LT^0 and T^{-1} (C) M^0LT^{-1} and LT^{-2} (D) M^0LT^{-1} and T

Q.4 The Bernoulli's eqution may be written as :

$P + \frac{1}{2}\rho v^2 + h\rho g = K$ (a constant)

The unit of K/P is same as that of -

(A) pressure (B) thrust (C) angle (D) None of these

Q.5 Which of the following is dimensionally correct?

(A) Pressure = momentum per unit volume

(B) Pressure = momentum per unit volume per unit energy

(C) Pressure = energy per unit volume

(D) Pressure = energy per unit area

Q.6 Which of the following is the most accurate measurement?

(A) 20×10^{-3} m (B) 200×10^{-4} m (C) 2×10^{-2} m (D) 0.02 m

Q.7 Given that $Y = a \sin \omega t + bt + ct^2 \cos \omega t$. The units of *abc* is same as that of

(A) y (B) y/t (C) $(y/t)^2$ (D) $(y/t)^3$

Q.8 An experiment measures quantities a, b, c and then X is calculated from $X = \frac{a^{1/2}b^2}{c^3}$. If the percentage error in a, b and c are ± 1%, ±3%, and ±2%, respectively, then the percentage error in X can be

(A) 12.5% (B) 7% (C) 1% (D) 4%

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Q.9 The number of significant figures in the numbers 4.8000×10^4 and 48000.50 are respectively -

(A) 5 and 6 (B) 5 and 7 (C) 2 and 7 (D) 2 and 6

Q.10 The area of a rectangle of size 1.23 cm × 2.345 cm is -

(A) 2.88 cm^2 (B) 2.884 cm^2 (C) 2.9 cm^2 (D) 2.88435 cm^2

ANSWER KEY

1. (B)	**2.** (A)	**3.** (A)	**4.** (D)	**5.** (C)	**6.** (B)	**7.** (D)
8. (A)	**9.** (B)	**10.** (B)				

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UNIT AND DIMENSION DPP-2

Q.1 Multiply 107.88 by 0.610 and express the result with proper regard to the significant figures -
(A) 65.8068 (B) 65.887 (C) 65.81 (D) 65.9

Q.2 Which of the following is not represented in correct unit -
(A) $\frac{\text{Stress}}{\text{Strain}} = N/m^2$ (B) Surface tension = N/m
(C) Energy = kg-m/sec (D) Pressure = N/m^2

Q.3 The unit of angular acceleration in the SI system is -
(A) $N\,kg^{-1}$ (B) ms^{-2} (C) $rad\,s^{-2}$ (D) $m\,kg^{-1}\,K$

Q.4 Which pair has the same dimensions -
(A) Work and power (B) Density and relative density
(C) Momentum and impulse (D) Stress and strain

Q.5 The dimensional formula for the modulus of rigidity is -
(A) ML^2T^{-2} (B) $ML^{-1}T^{-3}$ (C) $ML^{-2}T^{-2}$ (D) $ML^{-1}T^{-2}$

Q.6 The period of a body under SHM is represented by $T = P^aD^bS^c$; where P is pressure, D is density and S is surface tension. The value of a, b and c are -
(A) $-\frac{3}{2},\frac{1}{2},1$ (B) $-1, -2, 3$ (C) $\frac{1}{2},-\frac{3}{2},-\frac{1}{2}$ (D) $1, 2, \frac{1}{3}$

Q.7 The resistance $R = \frac{V}{i}$ where $V = 100 \pm 5$ volts and $i = 10 \pm 0.2$ amperes. What is the total error in R -
(A) 5% (B) 7% (C) 5.2% (D) $\frac{5}{2}\%$

Q.8 If $a = Bt^2 + Ct$, where 'a' is acceleration and t is time, the dimension of B will be-
(A) $[M^0LT^{-4}]$ (B) $[M^0LT^{-2}]$ (C) $[M^0LT^0]$ (D) $[MLT^{-4}]$

Q.9 According to quantum mechanics light travels in the form of packets and energy associated with each packet is $E = h\nu$, where h is Planck's constant and ν is the frequency. The dimensional formula for Planck's constant is -
(A) $[M^1L^2T^{-1}]$ (B) $[M^2L^{-1}T^2]$ (C) $[ML^2T^{-1}]$ (D) $[ML^{-2}T^1]$

Q.10 Given that v is the speed, r is the radius and g is the acceleration due to gravity. Which of the following is dimensionless?
(A) v^2/rg (B) v^2r/g (C) v^2g/r (D) v^2rg

ANSWER KEY

D) 2. (C) 3. (C) 4. (C) 5. (D) 6. (A) 7. (B)
A) 9. (C) 10. (A)

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