DATE 01-05-2016

TEST-PHYSICS
CLASS 11th

TIME: 60 Min
MARKS : 80

In all Questions, 4 marks will be awarded for correct answer and –1 for every wrong attempt.

1. Find the dimensional formula for 'a' in $S = \frac{a}{b}\sin(bt)$ here t represents time & S distance.
   (A) LT^{-1} (B) L (C) T (D) T^{-1}

2. Find the value of gravitational constant G in cgs units (6.67×10^{-11} Nm^2/kg^2)
   (A) 6.67×10^{-8} units (B) 6.67×10^{-10} units (C) 6.67×10^{-5} units (D) None of these

3. In a given formula, $Re = \frac{d \times \upsilon \times r}{\eta}$ where d = density, υ = velocity and r = radius
   η = coefficient of viscosity. The correct dimensional formula for Re is (useful formula $F = 6\pi\eta r\upsilon$)
   (A) $M^o\ LT^{-1}$ (B) $M^2L^2\ T^{-1}$ (C) $M^oL^oT^o$ (D) None of these

4. If velocity (V), force (F) and energy (E) are taken as fundamental units, then dimensional formula for mass will be-
   (A) $V^2\ F^0\ E$ (B) $V^0\ F\ E^2$ (C) $V\ F^{-2}\ E^0$ (D) $V^{-2}\ F^0\ E$

5. If P represents radiation pressure, C represents speed of light and Q represents radiation energy striking a unit area per second, then the nonzero integers x, y and z, such that $P^x\ Q^y\ C^z$ is dimensionless are-
   (A) x = 1, y = 1, z = 1 (B) x = 1, y = –1, z = 1
   (C) x = –1, y = 1, z = 1 (D) x = 1, y = 1, z = –1

6. Which of the following is a derived unit
   (A) mass (B) Length (C) time (D) velocity

7. The dimensional formula for Planck's constant (h) is ($E=h\nu$)
   (A) $ML^{-2}T^{-3}$ (B) ML^2T^{-2} (C) ML^2T^{-1} (D) $ML^{-2}T^{-2}$

8. Which of the following is dimensionally correct
   (A) Pressure = Energy per unit area (B) Pressure = Energy per unit volume
   (C) Pressure = Force per unit volume (D) Pressure = Momentum / (volume x time)

9. A pressure of 10^6 dyne/cm^2 is equivalent to :
   (A) 10^5 N/m^2 (B) 10^6 N/m^2 (C) 10^7 N/m^2 (D) 10^8 N/m^2

10. All units can be expressed in terms of
    (A) Fundamental units (B) derived units (C) Both (A) and (B) (D) None of these

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11. It is given that $\text{Force} = \frac{\alpha}{\text{Density} + \beta^2}$

the dimensions of α and β in this equation are respectively

(A) $[M^2L^2T^{-2}]$ & $[M^{1/3}L^{-1}]$ (B) $[M^{1/3}L^{-1}]$ & $[M^2L^{-2}T^{-2}]$

(C) $[ML^2T^{-2}]$ & $[ML^{1/3}]$ (D) None of these

12. A satellite (mass m) orbits the earth (mass M) in a circle of radius R. G is the universal gravitational constant. Which is dimensionally incorrect :

(A) $T = 2\pi\sqrt{\frac{R^3}{GM}}$ (B) $T = \sqrt{\frac{R^3}{GM}}$ (C) $T = 2\pi\sqrt{\frac{GMm}{R^3}}$ (D) $R^3 = \frac{GM^2T^2}{m}$

13. If k represents kinetic energy, v velocity and t time and these are chosen as the fundamental units then, the unit of surface tension will be - (Surface Tension = Force / length)

(A) $kv^{-2}T^{-2}$ (B) $kv^{-1}T^{-2}$ (C) $k^2v^{-1}T^{-3}$ (D) $kv^{-2}T^{-1}$

14. $y = 6x^2 + 7x - 5$. Then $\frac{dy}{dx} = 25$ at :

(A) $x = \pm 2$ (B) $x = \pm 1$ (C) x = 0 (D)None of the above

15. If $f(x) = 5x^2 - 6x + 3$ and $\frac{df(x)}{dx} = 4$, then x equals :

(A) 0 (B) 4 (C) 1 (D) 2

16. tan15° is equilvalent to :

(A) $\left(2 - \sqrt{3}\right)$ (B) $(5 + \sqrt{3})$ (C) $\left(\frac{5 - \sqrt{3}}{2}\right)$ (D) $\left(\frac{5 + \sqrt{3}}{2}\right)$

17. Which of the following sets cannot enter into the list of fundamental quantities in any system of units?

(A) length, mass and velocity (B) length, time and velocity

(C) mass, time and velocity (D) length, time and mass

18. A dimensionless quantity

(A) never has a unit (B) always has a unit (C) may have a unit (D) does not exit

19. A unit less quantity

(A) never has a nonzero dimension (B) always has a nonzero dimension

(C) may have a nonzero dimension (D) does not exit

20. $\sin^2\theta$ is equivalent to :

(A) $\left(\frac{1+\cos\theta}{2}\right)$ (B) $\left(\frac{1+\cos 2\theta}{2}\right)$ (C) $\left(\frac{1-\cos 2\theta}{2}\right)$ (D) $\left(\frac{\cos 2\theta - 1}{2}\right)$

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