NEET : CHAPTER WISE TEST-1

SUBJECT :- PHYSICS **DATE.....**
CLASS :- 11th **NAME.....**
CHAPTER :- UNIT & MEASUREMENT **SECTION.....**

(SECTION-A)

1. Which of the following dimensional formula is/are correct.
(A) [permittivity of the free space × electric field] = $[M^0 L^{-2} T^1 A^1]$
(B) [electrical conductivity] = $[M^{-1} L^{-3} T^3 A^1]$
(C) [viscous force] = $[M^1 L^1 T^{-1}]$
(D) $\left[\frac{\text{Electric field}}{\text{Magnetic field}}\right] = [M^0 L^1 T^{-3}]$

2. If we define a new system of units in which the unit of length is double that of present unit then the numerical value of μ_0 (permeability of free space) will become
(A) half (B) double
(C) unchanged (D) 4 times

3. For a cubical block, error in measurement of sides is $\pm$ 1% and error in measurement of mass is $\pm$ 2%, then maximum possible error in density is -
(A) 1% (B) 5%
(C) 3% (D) 7%

4 Kerosene oil is flowing through a tube of length ℓ & radius r . The pressure difference between two ends of the tube is P , then the viscosity of oil is given by $\eta = \frac{P\ (r^2 - x^2)}{4\ v\ \ell}$ where v is velocity of oil at a distance x from the axis of tube . From this relation the dimensions of viscosity η are :
(A) $M L^2 T^2$ (B) $M L^{-1} T^{-1}$
(C) $M^0 L^0 T^0$ (D) $M L T^3$

5 The density of cube is measured by measuring its mass and length of the side . If the maximum errors in the measurement of mass and length are 4 % & 1 % respectively , the maximum error in the measurement of density is :
(A) 2 % (B) 5 %
(C) 1 % (D) 7 %

6 An experiment measures quantities a , b , c. Another quantity X is calculated from the formula, $X = \frac{a\ b^2}{c^3}$. If the percentage errors in a, b & c are $\pm$ 1 % , $\pm$ 3 % & $\pm$ 2 % respectively the maximum percentage error in X will be :
(A) $\pm$ 13 % (B) $\pm$ 7 %
(C) 15 % (D) none of these

7. Match the physical quantities given in column I with dimensions expressed in terms of mass (M), length (L), time (T) and charge (Q) given in column II and write the correct answer against the matched quantity.

Column I	**Column II**
(i) Angular momentum	(a) $ML^2 T^{-2}$
(ii) Latent heat	(b) $ML^2 Q^{-2}$
(iii) Torque	(c) $ML^2 T^{-1}$
(iv) Capacitance	(d) $ML^3 T^{-1} Q^{-2}$
(v) Inductance	(e) $M^{-1} L^{-2} T^2 Q^2$
(vi) Resistivity	(f) $L^2 T^{-2}$

(A) (i) - (c) (B) (ii) - (d)
(C) (iii) - (e) (D) (v) - (f)

8 A watt is :
(A) kg m/s^2 (B) kg m^2/s^3
(C) kg m/s (D) kg m^2/s^2

9 Kilowatt-hour is a unit of
(A) Power (B) Energy/time
(C) work (D) Power/ time

10. Experiment shows that two perfectly neutral parallel metal plates separated by a small distance d, attract each other via a very weak force, known as the Casimir force. The force per unit area of the plates, F, depends only on the Planck constant h, on the speed of light c, and on d. Which of the following has the best chance of being correct for F ?

(A) $F = \frac{hc}{d^2}$ (B) $F = \frac{hc}{d^4}$

(C) $F = \frac{hd^2}{c}$ (D) $F = \frac{d^4}{hc}$.

11. Which of the following quantity has the dimension of length.

(A) $\frac{\text{Young's modulus} \times \text{linear momentum}}{\text{Coefficient of viscosity} \times \text{surface tension}}$

(B) $\frac{\text{Coefficient of viscosity} \times \text{surface tension}}{\text{Young's modulus} \times \text{linear momentum}}$

(C) $\frac{\text{pressure} \times \text{Coefficient of viscosity}}{\text{Young's modulus} \times \text{surface tension}}$

(D) $\frac{\text{Young's modulus} \times \text{surface tension}}{\text{pressure} \times \text{Coefficient of viscosity}}$

12 Time period of oscillation of the surface of a small drop of liquid depends on density ρ, radius r and surface tension s. The surface tension of a free liquid surface is defined as force per unit length. The dependence of time period can be given by

(A) $T \alpha \left(\frac{\rho r^3}{s}\right)^{1/2}$ (B) $T \alpha \rho rs$

(C) $T \alpha \frac{\rho r}{s}$ (D) $T \alpha \frac{s}{\rho r}$

13. The surface tension and bulk modulus of elasticity of water are S and B respectively. Then the ratio $\frac{B}{S}$ is dimensionally equivalent to the dimension of

(A) Length (B) Wave number

(C) $(\text{area})^{-1}$ (D) Force

14. Due to explosion under water, a gas bubble is formed which oscillates with a Time Period T. Experimentally, it was found that T is proportional to $P^a d^b E^c$, where P is the static pressure, d is the density and E is the total energy of explosion.The values of a, b and c are:

(A) a = 0, b = 1, c = 2

(B) a = 1, b = 2, c = 1

(C) $a = \frac{5}{6}$, $b = \frac{1}{2}$, $c = \frac{1}{2}$

(D) $a = \frac{-5}{6}$, $b = \frac{1}{2}$, $c = \frac{1}{3}$

15. The S.I.unit of inductance henry can not be written as :

(A) Weber/ampere

(B) Volt second/ampere

(C) $\text{Joule}/(\text{ampere})^2$

(D) Ohm/sec

16. The readings of a constant potential difference is noted four times by a student. The student averages these readings but does not take into account the zero error of the voltmeter. The average measurement of the potential difference is

Reading 1	1.176 V
Reading 2	1.178 V
Reading 3	1.177 V
Reading 4	1.176 V

(A) precise and accurate

(B) precise but not accurate

(C) accurate but not precise

(D) not accurate and not precise

17. A vernier calipers which is used to measure length of a cylinder has 1mm marks on the main scale. It has 10 equal division on the vernier scale which match with 8 marks of main scale. If main scale reading is 4 and vernier reading is 5 then the length of cylinder is $1.25 \text{ N} \times 10^{-3}$ m then calculate N :

(A) 3 (B) 4 (C) 7 (D) 2

18. An unknown quantity x is measured using an experiment by measuring a length ℓ(in cm) from scale having least count of 1cm. Formula used is $x = R\frac{\ell}{100-\ell}$. R is known accurately. Find the percentage error in measurement of 'x' for ℓ = 50 cm.
(A) 4 (B) 7 (C) 9 (D) 12

19. The length and breadth of a rectangle are (6.0 0.3) cm and (4.0 0.2) cm. Then the area of the rectangle with error limits is :
(A) 26 cm^2 (B) (24 ± 2) cm^2
(C) (24.0 ± 4.8) cm^2 (D) (24.0 2.4) cm^2

20. **Assertion :** Distance is always a non negative quantity.
Reason : Distance is a scalar quantity.
(A) Statement-1 is True, Statement-2 is True; Statement-2 **is** a correct explanation for Statement-1
(B) Statement-1 is True, Statement-2 is True; Statement-2 **is NOT** a correct explanation for Statement-1
(C) Statement-1 is True, Statement-2 is False
(D) Statement-1 is False, Statement-2 is True.

21. **Assertion :** The numerical value of a physical quantity remains same in every system of units.
Reason : The product of the numerical value and unit of a physical quantity remains same in any system of units.
(A) Statement-1 is True, Statement-2 is True; Statement-2 **is** a correct explanation for Statement-1
(B) Statement-1 is True, Statement-2 is True; Statement-2 **is NOT** a correct explanation for Statement-1
(C) Statement-1 is True, Statement-2 is False
(D) Statement-1 is False, Statement-2 is True.

22. Which of the following is not the unit of length :
(A) micron (B) light year
(C) angstrom (D) radian

23. Unit of Stefan's constant is :-
(A) Watt–m^2 –K^4 (B) Watt–m^2 –K^4
(C) Watt /m^2 –K (D) Watt /m^2 K^4

24. If n is number and u is the unit of a physical quantity then which of the following is correct for the measurement of "n"-
(A) $n \propto$ size of u (B) $n \propto u^2$
(C) $n \propto \sqrt{u}$ (D) $n \propto \frac{1}{u}$

25. In C.G.S. system the magnitude of the force is 100 dynes. In another system where the fundamental physical quantities are kilogram, meter and minute, the magnitude of the force is-
(A) 0.036 (B) 0.36
(C) 3.6 (D) 36

26. The units of angular momentum are-
(A) kg-m^2/s^2 (B) joules-s
(C) joules/s (D) kg-m s^{-2}

27. The ratio of S.I. units to the C.G.S units of 'G' is -
(A) 10^{-2} (B) 10^{-3}
(C) 10^2 (D) 10^3

28. If the units of M & L are doubled then the unit of kinetic energy will become -
(A) 8 times (B) 16 times
(C) 4 times (D) 2 times

29. Unit of impulse is :
(A) Newton (B) kg-m
(C) kg- m/s (D) Joule

30. The unit of permittivity of free space ε is :-
(A) Newton $metre^2$/$Coulomb^2$
(B) Coulomb/Newton metre
(C) $Coulomb^2$ /Newton $metre^2$
(D) $Coulomb^2$ / (Newton $metre)^2$

31. Which of the following set have different dimensions ?
(A) Pressure, Young's modulus, Stress

(B) Emf, Potential difference, Electric potential
(C) Heat, Work done, Energy
(D) Dipole moment, Electric flux, Electric field

32. Pressure gradient has the same dimesion as that of
(A) Velocity gradient
(B) Potenital gradient
(C) Energy gradient
(D) None of these

33. " Pascal -Second ''has dimension of
(A) Force
(B) Energy
(C) Pressure
(D) Coefficient of Viscosity

34. Which relation is wrong
(A) 1 Calore = 4.18 Joules
(B) 1Å = 10^{-10} m
(C) 1MeV = 1.6 ×10^{-13} Joules
(D) 1 Newton =10^{-5} Dynes

35. In a given relation $F = at^1 + bt^2$, F and t denote the force and the time respectively, then dimensions of a and b are respectively as –
(A) $M^{\circ}L^{\circ}T^{1}$, $M^{\circ}L^{\circ}T^{-2}$
(B) $M^{\circ}L^{1}T^{-2}$, $M^{\circ}L^{2}T^{-2}$
(C) $M^{1}L^{1}T^{-3}$, $M^{1}L^{1}T^{-4}$
(D) $M^{1}L^{1}T^{-1}$, $M^{1}L^{1}T^{-2}$

(SECTION-B)

36. Dimensions of Torque are-
(A) $M^{1}L^{2}T^{-2}$ (B) $M^{2}L^{2}T^{2}$
(C) $M^{-1}LT^{-1}$ (D) $M^{-2}L^{-2}T^{-2}$

37. Which of the following is dimensionless -
(A) universal gravitational constant
(B) relative permittivity
(C) relative velocity
(D) density

38. What will be the unit of c in the equation $S = a + bt + ct^2$ if the units of S and t are meter and second respectively -
(A) meter (B) meter-sec^{-1}
(C) meter-sec^{-2} (D) meter-sec

39. In a system of unit if force (F), acceleration (A) and time (T) are taken as fundamental units then the dimensional formula of energy is :
(A) FA^2T (B) FAT^2
(C) F^2AT (D) FAT

40. In the previous question, minimum possible error in area measurement can be -
(A) $\pm$ 0.02 cm^2 (B) $\pm$ 0.01 cm^2
(C) $\pm$ 0.03 cm^2 (D) Zero

41. The least count of a stop watch is 0.2 second. The time of 20 oscillations of a pendulum is measured to be 25 seconds. The percentage error in the time period is
(A) 16% (B) 0.8 %
(C) 1.8 % (D) 8 %

42. The mass of a ball is 1.76 kg. The mass of 25 such balls is
(A) 0.44 × 10^3 kg (B) 44.0 kg
(C) 44 kg (D) 44.00 kg

43. Two resistors R_1 (24 ± 0.5) Ω and R_2 (8 ± 0.3) Ω are joined in series. The equivalent resistance is
(A) 32 ± 0.33 Ω (B) 32 ± 0.8 Ω
(C) 32 ± 0.2 Ω (D) 32 ± 0.5 Ω

44. In an experiment, the percentage of error occurred in the in the measurement of physical quantities A, B, C and D are 1%, 2%, 3% and 4% respectively. Then the maximum percentage of error in the measurement X, where $X = \frac{A^2B^{1/2}}{C^{1/3}D^3}$, will be
(A) 10 % (B) $\left(\frac{3}{13}\right)\%$
(C) 16% (D) – 10%

45. The dimension of $\frac{1}{2}\varepsilon_0 E^2$, where ε_0 is permittivity of free space and E is electric field, is

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

46. If force (F), velocity(V) and time (T) are taken as fundamental units, the dimensions of mass are

(A) $[FVT^{-1}]$ (B) $[FVT^{-2}]$
(C) $[FV^{-1}T^{-1}]$ (D) $[FV^{-1}T]$

47. The dimension of $\frac{R}{L}$ are

(A) T^2 (B) T
(C) T^{-1} (D) T^{-2}

48. "Pascal-Second" has dimension of

(A) Force
(B) Energy
(C) Pressure
(D) Coefficient of viscosity

49. The ratio of the dimension of Planck's constant and that of moment of inertia is the dimension of

(A) Frequency (B) Velocity
(C) Angular momentum (D) Time

50. The period of oscillation of a simple pendulum is given by $T = 2\pi\sqrt{\frac{l}{g}}$ where *l* is about 100 *cm* and is known to have 1*mm* accuracy. The period is about 2*s*. The time of 100 oscillations is measured by a stop watch of least count 0.1 s. The percentage error in *g* is

(A) 0.1% (B) 1%
(C) 0.2% (D) 0.8%