PHYSICS

CP01

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. The density of material in CGS system of units is $4\,g/cm^3$. In a system of units in which unit of length is 10 cm and unit of mass is 100 g, the value of density of material will be
   (a) 0.4 unit   (b) 40 unit
   (c) 400 unit   (d) 0.04 unit

2. The time period of a body under S.H.M. is represented by: $T = P^a\, D^b\, S^c$ where P is pressure, D is density and S is surface tension, then values of a, b and c are

   (a) $-\dfrac{3}{2}, \dfrac{1}{2}, 1$ (b) $-1, -2, 3$

   (c) $\dfrac{1}{2}, -\dfrac{3}{2}, -\dfrac{1}{2}$ (d) $1, 2, \dfrac{1}{3}$

3. The respective number of significant figures for the numbers 23.023, 0.0003 and 2.1×10^{-3} are
   (a) 5, 1, 2   (b) 5, 1, 5   (c) 5, 5, 2   (d) 4, 4, 2

4. Young's modulus of a material has the same unit as that of
   (a) pressure   (b) strain
   (c) compressibility   (d) force

5. Of the following quantities, which one has dimensions different from the remaining three?
   (a) Energy per unit volume
   (b) Force per unit area
   (c) Product of voltage and charge per unit volume
   (d) Angular momentum

6. The pressure on a square plate is measured by measuring the force on the plate and length of the sides of the plate by using the formula $P = \dfrac{F}{\ell^2}$. If the maximum errors in the measurement of force and length are 4% and 2% respectively, then the maximum error in the measurement of pressure is
   (a) 1%   (b) 2%   (c) 8%   (d) 10%

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
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7. The siemen is the SI unit of
   (a) resistivity   (b) resistance
   (c) conductivity   (d) conductance

8. An object is moving through the liquid. The viscous damping force acting on it is proportional to the velocity. Then dimensions of constant of proportionality are
   (a) $[ML^{-1}T^{-1}]$ (b) $[MLT^{-1}]$
   (c) $[M^0LT^{-1}]$ (d) $[ML^0T^{-1}]$

9. The least count of a stop watch is 0.2 second. The time of 20 oscillations of a pendulum is measured to be 25 second. The percentage error in the measurement of time will be
   (a) 8%   (b) 1.8%   (c) 0.8%   (d) 0.1%

10. Weber is the unit of
    (a) magnetic susceptibility
    (b) intensity of magnetisation
    (c) magnetic flux
    (d) magnetic permeability

11. The physical quantity which has the dimensional formula $[M^1T^{-3}]$ is
    (a) surface tension   (b) solar constant
    (c) density   (d) compressibility

12. The dimensions of Wien's constant are
    (a) $[ML^0 T K]$ (b) $[M^0 LT^0 K]$
    (c) $[M^0 L^0 T K]$ (d) $[MLTK]$

13. If the capacitance of a nanocapacitor is measured in terms of a unit 'u' made by combining the electric charge 'e', Bohr radius 'a_0', Planck's constant 'h' and speed of light 'c' then
    (a) $u = \dfrac{e^2 h}{a_0}$ (b) $u = \dfrac{hc}{e^2 a_0}$
    (c) $u = \dfrac{e^2 c}{h a_0}$ (d) $u = \dfrac{e^2 a_0}{hc}$

14. The dimensions of $\dfrac{1}{\epsilon_o} \dfrac{e^2}{hc}$ are
    (a) $M^{-1} L^{-3} T^4 A^2$ (b) $ML^3 T^{-4} A^{-2}$
    (c) $M^0 L^0 T^0 A^0$ (d) $M^{-1} L^{-3} T^2 A$

15. The density of a cube is measured by measuring its mass and length of its sides. If the maximum error in the measurement of mass and length are 4% and 3% respectively, the maximum error in the measurement of density will be
    (a) 7%   (b) 9%   (c) 12%   (d) 13%

16. Which is different from others by units ?
    (a) Phase difference   (b) Mechanical equivalent
    (c) Loudness of sound   (d) Poisson's ratio

17. A quantity X is given by $\epsilon_0 L \dfrac{\Delta V}{\Delta t}$ where ϵ_0 is the permittivity of the free space, L is a length, DV is a potential difference and Dt is a time interval. The dimensional formula for X is the same as that of
    (a) resistance   (b) charge
    (c) voltage   (d) current

18. If the error in the measurement of the volume of sphere is 6%, then the error in the measurement of its surface area will be
    (a) 2%   (b) 3%   (c) 4%   (d) 7.5%

19. If velocity (V), force (F) and energy (E) are taken as fundamental units, then dimensional formula for mass will be
    (a) $V^{-2}F^0E$ (b) V^0FE^2 (c) $VF^{-2}E^0$ (d) $V^{-2}F^0E$

20. Multiply 107.88 by 0.610 and express the result with correct number of significant figures.
    (a) 65.8068   (b) 65.807   (c) 65.81   (d) 65.8

21. Which of the following is a dimensional constant?
    (a) Refractive index   (b) Poissons ratio
    (c) Strain   (d) Gravitational constant

22. If E, m, J and G represent energy, mass, angular momentum and gravitational constant respectively, then the dimensional formula of EJ^2/m^5G^2 is same as that of the
    (a) angle   (b) length   (c) mass   (d) time

23. The refractive index of water measured by the relation $m = \dfrac{\text{real depth}}{\text{apparent depth}}$ is found to have values of 1.34, 1.38, 1.32 and 1.36; the mean value of refractive index with percentage error is
    (a) $1.35 \pm 1.48\%$ (b) $1.35 \pm 0\%$
    (c) $1.36 \pm 6\%$ (d) $1.36 \pm 0\%$

RESPONSE GRID					
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17. ⓐⓑⓒⓓ	18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ	20. ⓐⓑⓒⓓ	21. ⓐⓑⓒⓓ
22. ⓐⓑⓒⓓ	23. ⓐⓑⓒⓓ			

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24. If e is the charge, V the potential difference, T the temperature, then the units of $\dfrac{eV}{T}$ are the same as that of
(a) Planck's constant   (b) Stefan's constant
(c) Boltzmann's constant (d) gravitational constant

25. The dimensions of mobility are
(a) $M^{-2}T^2A$ (b) $M^{-1}T^2A$
(c) $M^{-2}T^3A$ (d) $M^{-1}T^3A$

26. Two quantities A and B have different dimensions which mathematical operation given below is physically meaningful?
(a) A/B   (b) A + B   (c) A – B   (d) A = B

27. The velocity of water waves (v) may depend on their wavelength l, the density of water r and the acceleration due to gravity, g. The method of dimensions gives the relation between these quantities is
(a) v   (b) $v^2 \propto g\lambda$
(c) $v^2 \propto g\lambda^2$ (d) $v^2 \propto g^{-1}\lambda^2$

28. The physical quantities not having same dimensions are
(a) torque and work
(b) momentum and Planck's constant
(c) stress and Young's modulus
(d) speed and $(m_0 e_0)^{-1/2}$

29. A physical quantity of the dimensions of length that can be formed out of c, G and $\dfrac{e^2}{4\pi\varepsilon_0}$ is [c is velocity of light, G is universal constant of gravitation and e is charge]
(a) $c^2\left[G\dfrac{e^2}{4\pi\varepsilon_0}\right]^{1/2}$ (b) $\dfrac{1}{c^2}\left[\dfrac{e^2}{G4\pi\varepsilon_0}\right]^{1/2}$
(c) $\dfrac{1}{c}G\dfrac{e^2}{4\pi\varepsilon_0}$ (d) $\dfrac{1}{c^2}\left[G\dfrac{e^2}{4\pi\varepsilon_0}\right]^{1/2}$

30. The unit of impulse is the same as that of
(a) energy   (b) power
(c) momentum   (d) velocity

31. If Q denote the charge on the plate of a capacitor of capacitance C then the dimensional formula for $\dfrac{Q^2}{C}$ is
(a) $[L^2M^2T]$ (b) $[LMT^2]$
(c) $[L^2MT^{-2}]$ (d) $[L^2M^2T^2]$

32. The mass of the liquid flowing per second per unit area of cross-section of the tube is proportional to (pressure difference across the ends)^n and (average velocity of the liquid)^m. Which of the following relations between m and n is correct?
(a) m = n   (b) m = –n   (c) $m^2 = n$ (d) $m = -n^2$

33. The Richardson equation is given by $I = AT^2 e^{-B/kT}$. The dimensional formula for AB^2 is same as that for
(a) $I T^2$ (b) kT   (c) $I k^2$ (d) $I k^2/T$

34. Turpentine oil is flowing through a capillary tube of length ℓ and radius r. The pressure difference between the two ends of the tube is p. The viscosity of oil is given by :
$\eta = \dfrac{p(r^2 - x^2)}{4v\ell}$. Here v is velocity of oil at a distance x from the axis of the tube. From this relation, the dimensional formula of η is
(a) $[ML^{-1}T^{-1}]$ (b) $[MLT^{-1}]$
(c) $[ML^2T^{-2}]$ (d) $[M^0L^0T^0]$

35. Given that $y = A\sin\left[\left(\dfrac{2\pi}{\lambda}(ct - x)\right)\right]$, where y and x are measured in metre. Which of the following statements is true?
(a) The unit of λ is same as that of x and A
(b) The unit of λ is same as that of x but not of A
(c) The unit of c is same as that of $\dfrac{2\pi}{\lambda}$
(d) The unit of (ct – x) is same as that of $\dfrac{2\pi}{\lambda}$

36. If L = 2.331 cm, B = 2.1 cm, then L + B =
(a) 4.431 cm   (b) 4.43 cm   (c) 4.4 cm   (d) 4 cm

37. In the relation x = cos (ωt + kx), the dimension(s) of ω is/are
(a) $[M^0 LT]$ (b) $[M^0L^{-1}T^0]$
(c) $[M^0L^0T^{-1}]$ (d) $[M^0LT^{-1}]$

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29. ⓐⓑ©ⓓ	**30.** ⓐⓑ©ⓓ	**31.** ⓐⓑ©ⓓ	**32.** ⓐⓑ©ⓓ	**33.** ⓐⓑ©ⓓ
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38. In a vernier callipers, ten smallest divisions of the vernier scale are equal to nine smallest division on the main scale. If the smallest division on the main scale is half millimeter, then the vernier constant is

(a) 0.5 mm (b) 0.1 mm (c) 0.05 mm (d) 0.005 mm

39. Which two of the following five physical parameters have the same dimensions?

(A) Energy density (B) Refractive index
(C) Dielectric constant (D) Young's modulus
(E) Magnetic field

(a) (B) and (D) (b) (C) and (E)
(c) (A) and (D) (d) (A) and (E)

40. In the eqn. $\left(P + \dfrac{a}{V^2}\right)(V - b) = $ constant, the unit of a is

(a) dyne cm^5 (b) dyne cm^4
(c) dyne/cm^3 (d) dyne cm^2

41. The dimensions of Reynold's constant are

(a) $[M^0L^0T^0]$ (b) $[ML^{-1}T^{-1}]$
(c) $[ML^{-1}T^{-2}]$ (d) $[ML^{-2}T^{-2}]$

42. Which of the following do not have the same dimensional formula as the velocity?

Given that m_0 = permeability of free space, e_0 = permittivity of free space, n = frequency, l = wavelength, P = pressure, r = density, w = angular frequency, k = wave number,

(a) $1/\sqrt{\mu_0 \varepsilon_0}$ (b) $n\,l$ (c) $\sqrt{P/\rho}$ (d) ωk

43. Unit of magnetic moment is

(a) ampere–metre^2 (b) ampere–metre
(c) weber–metre^2 (d) weber/metre

44. An experiment is performed to obtain the value of acceleration due to gravity g by using a simple pendulum of length L. In this experiment time for 100 oscillations is measured by using a watch of 1 second least count and the value is 90.0 seconds. The length L is measured by using a meter scale of least count 1 mm and the value is 20.0 cm. The error in the determination of g would be:

(a) 1.7% (b) 2.7% (c) 4.4% (d) 2.27%

45. The dimensional formula for magnetic flux is

(a) $[ML^2T^{-2}A^{-1}]$ (b) $[ML^3T^{-2}A^{-2}]$
(c) $[M^0L^{-2}T^2A^{-2}]$ (d) $[ML^2T^{-1}A^2]$

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DAILY PRACTICE PROBLEM DPP CHAPTERWISE CP01 - PHYSICS

Total Questions		45	Total Marks		180
Attempted			Correct		
Incorrect			Net Score		
Cut-off Score		50	Qualifying Score		70
Success Gap = Net Score – Qualifying Score					
Net Score = (Correct × 4) – (Incorrect × 1)					

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