

Jupiter Academy

Subjects : Physics

PRACTICE PAPER 01

Total Marks : 180

Physics - Section A (MCQ.)

- The main scale of vernier callipers reads in millimetre and its vernier is divided into 8 divisions, which coincides with 5 divisions of main scale. When two jaws of instrument touch each other, the zero of the vernier coincides with the zero of main scale. A rod is tightly placed along its length between both jaws. It is observed that the zero of vernier scale lies just left to 36^{th} division of main scale and fourth division of vernier scale coincides with the main scale. Then the measured value is cm
A) 3.66 B) 3.55 C) 3.65 D) 3.56
- Consider the following equation of Bernoulli's theorem. $P + \frac{1}{2}\rho V^2 + \rho gh = K$ (constant) The dimensions of K/P are same as that of which of the following
A) Thrust B) Pressure C) Angle D) Viscosity
- The unit of Stefan-Boltzmann's constant (σ) is
A) $\frac{watt^4}{m \times K^4}$ B) $\frac{calorie}{m^2 \times K^4}$
C) $\frac{watt}{m^2 \times K^4}$ D) $\frac{joule}{m^2 \times K^4}$
- The focal power of a lens has the dimensions
A) $[L]$ B) $[ML^2T^{-3}]$
C) $[L^{-1}]$ D) $[ML^{-3}]$
- With the usual notations, the following equation $S_t = u + \frac{1}{2}a(2t - 1)$ is
A) Only numerically correct
B) Only dimensionally correct
C) Both numerically and dimensionally correct
D) Neither numerically nor dimensionally correct
- The quantities A and B are related by the relation, $m = A/B$, where m is the linear density and A is the force. The dimensions of B are of
A) Pressure B) Work
C) Latent heat D) None of the above
- A public park, in the form of a square, has an area of $(100 \pm 0.2)m^2$. The side of park is m
A) (10 ± 0.01) B) (10 ± 0.1)
C) (10 ± 0.02) D) (10 ± 0.2)
- The unit of length, velocity and force are doubled. Which of the following is the correct change in the other units?
A) Unit of time is doubled
B) Unit of mass is doubled
C) Unit of momentum is doubled
D) Unit of energy is doubled
- Which of the following is not a unit of self-inductance
A) Weber/Ampere
B) Ohm – Second
C) Joule – Ampere
D) oule – Ampere⁻²
- The radius of a circle is 2.12 metre. Its area according to the rule of significant figures is m²
A) 14.1 B) 14.112
C) 14.11 D) 14.1124
- If A and B are two physical quantities having different dimensions then which of the following can't denote a physical quantity?
A) $A + \frac{A^3}{B}$ B) $\exp\left(-\frac{A}{B}\right)$
C) AB^2 D) $\frac{A}{B^4}$
- The volume of a sphere is 1.76 cm^3 . The volume of 25 such spheres taking into account the significant figure is
A) $0.44 \times 10^2\text{ cm}^3$ B) 44.0 cm^3
C) 44 cm^3 D) 44.00 cm^3
- Two resistance are measured in Ohm and is given as $R_1 = 3\Omega \pm 1\%$ and $R_2 = 6\Omega \pm 2\%$ When they are connected in parallel, the percentage error in equivalent resistance is..... %
A) 3 B) 4.5 C) 0.67 D) 1.33
- A system has basic dimensions as density $[D]$, velocity $[V]$ and area $[A]$. The dimensional representation of force in this system is
A) $[AV^2D]$ B) $[A^2VD]$
C) $[AVD^2]$ D) $[A^0VD]$
- Which of the following is the most precise device for measuring length

- A) a vernier callipers with 20 divisions on the sliding scale
 B) a screw gauge of pitch 1 mm and 100 divisions on the circular scale
 C) an optical instrument that can measure length to within a wavelength of light
 D) Precision can not be changed by changing the instrument.

16. The fundamental unit which has the same power in the dimension formula of surface tension and viscosity is

- A) mass B) length C) time D) None of the above

17. A scientist performs an experiment in order to measure a certain physical quantity and takes 100 observations. He repeats the same experiment and takes 400 observations. By doing so,

- A) the possible error remains same.
 B) the possible error is doubled.
 C) the possible error is halved.
 D) the possible error is reduced to one fourth.

18. The maximum percentage errors in the measurement of mass (M), radius (R) and angular velocity (ω) of a ring are 2%, 1% and 1% respectively, then find the maximum percentage error in the measurement of its rotational kinetic energy ($K = \frac{1}{2} I \omega^2$)

- A) 3 B) 6 C) 4 D) 1

19. In a particular system the units of length, mass and time are chosen to be 10 cm, 10 g, and 0.1 s respectively. The units of force in this system will be equal to?

- A) 0.1 B) 1 C) 10 D) 100

20. The dimensions of K in the equation $W = \frac{1}{2} K x^2$ is

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

21. The dimensions of inter atomic force constant are

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

22. Match List-I with List-II and select the correct answer using the codes given below the lists

List-I	List-II
I – Joule	A – Henry $\times$ Amp/sec
II – Watt	B – Farad $\times$ Volt
III – Volt	C – Coulomb $\times$ Volt
IV – Coulomb	D – Oersted $\times$ cm
	E – Amp $\times$ Gauss
	F – Amp ² $\times$ Ohm

A) I – A, II – F, III – E, IV – D

B) I – C, II – F, III – A, IV – B

C) I – C, II – F, III – A, IV – E

D) I – B, II – F, III – A, IV – C

23. Time period $T \propto P^a d^b E^c$ then value of c is given p is pressure, d is density and E is energy

- A) $-\frac{5}{6}$ B) $\frac{1}{2}$ C) $\frac{1}{3}$ D) 1

24. Joule – second is the unit of

- A) Work B) Momentum
 C) Pressure D) Angular momentum

25. If C and L denote capacitance and inductance respectively, then the dimensions of LC are

- A) $M^0 L^0 T^0$ B) $M^0 L^0 T^2$
 C) $M^2 L^0 T^2$ D) MLT^2

26. The dimensional formula for a physical quantity x is $[M^{-1} L^3 T^{-2}]$. The errors in measuring the quantities M, L and T respectively are 2%, 3% and 4%. The maximum percentage of error that occurs in measuring the quantity x is

- A) 9 B) 10 C) 14 D) 19

27. The number of significant figures in all the given numbers 25.12, 2009, 4.156 and 1.217×10^{-4} is

- A) 1 B) 2 C) 3 D) 4

28. If there is a positive error of 50% in the measurement of velocity of a body, then the error in the measurement of kinetic energy is %

- A) 25 B) 50 C) 100 D) 125

29. Which one of the following does not have the same dimensions

- A) Work and energy
 B) Angle and strain
 C) Relative density and refractive index
 D) Planck constant and energy

30. The dimension of the ratio of angular to linear momentum is

- A) $M^0 L^1 T^0$
 B) $M^1 L^1 T^{-1}$
 C) $M^1 L^2 T^{-1}$
 D) $M^{-1} L^{-1} T^{-1}$
31. Which one has the dimensions different from the remaining three
 A) Power B) Work C) Torque D) Energy
32. The unit of reactance is
 A) Ohm B) Volt C) Mho D) Newton
33. Dimensional formula for volume elasticity is
 A) $M^1 L^{-2} T^{-2}$
 B) $M^1 L^{-3} T^{-2}$
 C) $M^1 L^2 T^{-2}$
 D) $M^1 L^{-1} T^{-2}$
34. Select the pair whose dimensions are same
 A) Pressure and stress B) Stress and strain
 C) Pressure and force D) Power and force
35. Which does not has the same unit as others
 A) Watt-sec B) Kilowatt-hour
 C) eV D) J-sec
36. Which relation is wrong
 A) 1 Calorie = 4.18 Joules
 B) $1 \text{ \AA} = 10^{-10} m$
 C) $1 \text{ MeV} = 1.6 \times 10^{-13} \text{ Joules}$
 D) $1 \text{ Newton} = 10^{-5} \text{ Dynes}$
37. The unit of angular acceleration in the SI system is
 A) $N kg^{-1}$
 B) $m s^{-2}$
 C) $rad s^{-2}$
 D) $m kg^{-1} K$
38. $1 kWh =$
 A) 1000W B) $36 \times 10^5 J$
 C) 1000J D) 3600 J
39. One second is equal to
 A) 1650763.73 time periods of Kr clock
 B) 652189.63 time periods of Kr clock
 C) 1650763.73 time periods of Cs clock
 D) 9192631770 time periods of Cs clock

40. **Assertion** : The error in the measurement of radius of the sphere is 0.3%. The permissible error in its surface area is 0.6%
Reason : The permissible error is calculated by the formula $\frac{\Delta A}{A} = \frac{4\Delta r}{r}$
 A) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
 B) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
 C) If the Assertion is correct but Reason is incorrect.
 D) If both the Assertion and Reason are incorrect.
41. The speed of light (c), gravitational constant (G) and planck's constant (h) are taken as fundamental units in a system. The dimensions of time in this new system should be
 A) $G^{1/2} h^{1/2} c^{-5/2}$ B) $G^{-1/2} h^{1/2} c^{1/2}$
 C) $G^{1/2} h^{1/2} c^{-3/2}$ D) $G^{1/2} h^{1/2} c^{1/2}$
42. The velocity v (in cm/sec) of a particle is given in terms of time t (in sec) by the relation $v = at + \frac{b}{t+c}$; the dimensions of a , b and c are
 A) $a = L^2, b = T, c = LT^2$
 B) $a = LT^2, b = LT, c = L$
 C) $a = LT^{-2}, b = L, c = T$
 D) $a = L, b = LT, c = T^2$
43. In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows $P = \frac{a^3 b^2}{cd}$. % error in P is %
 A) 14 B) 10 C) 7 D) 4
44. The percentage errors in the measurement of mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimation of the kinetic energy obtained by measuring mass and speed %
 A) 12 B) 8 C) 2 D) 10
45. Length cannot be measured by
 A) Fermi B) Debye
 C) Micron D) Light year