



Units And Measurements

Q.No.1:

Let $[\epsilon_0]$ denote the dimensional formula of the permittivity of vacuum. If M = mass, L = length, T = time and A = electric current, then:

JEE 2013

- A. $[\epsilon_0] = [M^{-1} L^{-3} T^2 A]$
- B. $[\epsilon_0] = [M^{-1} L^{-3} T^4 A^2]$
- C. $[\epsilon_0] = [M^{-1} L^2 T^4 A^{-2}]$
- D. $[\epsilon_0] = [M^{-1} L^2 T^{-1} A]$

Q.No.2: A student measured the length of a rod and wrote it as 3.50 cm. Which instrument did he use to measure it?

- A. A screw gauge having 100 divisions in the circular scale and pitch as 1 mm
- B. A screw gauge having 50 divisions in the circular scale and pitch as 1 mm
- C. A metre scale
- D. A vernier calliper where 10 divisions in the vernier scale matches with 9 divisions in the main scale and the main scale has 10 divisions in 1 cm

Q.No.3: A screw gauge with a pitch of 0.5 mm and a circular scale with 50 divisions is used to measure the thickness of a thin sheet of Aluminium. Before starting the measurement, it is found that when the two jaws of the screw gauge are brought in contact, the 45th division coincides with the main scale line and that the zero of the main scale is barely visible. What is the thickness of the sheet if the main scale reading is 0.5 mm and the 25th division coincides with the main scale line?

JEE 2016

- A. 0.80 mm
- B. 0.70 mm
- C. 0.50 mm
- D. 0.75 mm

Q.No.4: The density of a material in the shape of a cube is determined by measuring three sides of the cube and its mass. If the relative errors in measuring the mass and length are respectively 1.5% and 1%, the maximum error in determining the density is :

JEE 2018

- A. 4.5%
- B. 6%
- C. 2.5%
- D. 3.5%

Q.No.5: Expression for time in terms of G (universal gravitational constant), h (Planck constant) and c (speed of light) is proportional to:

JEE 2019

- A. $\sqrt{\frac{hc^5}{G}}$
- B. $\sqrt{\frac{c^3}{Gh}}$
- C. $\sqrt{\frac{Gh}{c^5}}$
- D. $\sqrt{\frac{Gh}{c^3}}$

Q.No.6: The pitch and the number of divisions, on the circular scale, for a given screw gauge are 0.5 mm and 100 respectively. When the screw gauge is fully tightened without any object, the zero of its circular scale lies 3 divisions below the mean line. The readings of the main scale and the circular scale, for a thin sheet, are 5.5 mm and 48 respectively, the thickness of this sheet is:

JEE 2019

- A. 5.755 mm
- B. 5.950 mm
- C. 5.725 mm
- D. 5.740 mm

Q.No.7: The density of a material in SI units is 128 kg m^{-3} . In certain units in which the unit of length is 25 cm and the unit of mass is 50 g, the numerical value of density of the material is: **JEE 2019**

- A. 40
- B. 16
- C. 640
- D. 410

Q.No.8: The diameter and height of a cylinder are measured by a meter scale to be $12.6 \pm 0.1 \text{ cm}$ and $34.2 \pm 0.1 \text{ cm}$, respectively. What will be the value of its volume in appropriate significant figures? **JEE 2019**

- A. $4264 \pm 81 \text{ cm}^3$
- B. $4264.4 \pm 81.0 \text{ cm}^3$
- C. $4260 \pm 80 \text{ cm}^3$
- D. $4300 \pm 80 \text{ cm}^3$

Q.No.9: The force of interaction between two atoms is given by $F = \alpha\beta \exp\left(-\frac{x^2}{\alpha kt}\right)$; where x is the distance, k is the Boltzmann constant and T is temperature and α and β are two constants. The dimension of β is: **JEE 2019**

- A. $M^0L^2T^{-4}$
- B. M^2LT^{-4}
- C. MLT^{-2}
- D. $M^2L^2T^{-2}$

Q.No.10: The least count of the main scale of a screw gauge is 1 mm. The minimum number of divisions on its circular scale required to measure $5 \mu\text{m}$ diameter of a wire is: **JEE 2019**

- A. 50
- B. 200
- C. 100
- D. 500