

CHAPTER-1 | Units and Measurement

QUIZ-01

1. How many base units are there in the SI system?

- A. 5 B. 7
C. 9 D. 11 (B)

Explanation: The SI system includes 7 base units such as metre, kilogram, second, etc.

2. Which of the following is a dimensionless quantity?

- A. Mass B. Plane angle
C. Force D. Temperature (B)

Explanation: Plane angle (radian) is derived from the ratio of two lengths and is dimensionless.

3. The number 0.06900 has how many significant figures?

- A. 2 B. 3
C. 4 D. 5 (C)

Explanation: Leading zeros are not significant, but trailing zeros after the decimal are. So, 6, 9, 0, and 0 are significant \rightarrow 4 figures.

4. Which formula is dimensionally incorrect for kinetic energy?

- A. $K = (1/2)mv^2$ B. $K = (3/16)mv^2$
C. $K = ma$ D. $K = (1/2)mv^2 + ma$ (C)

Explanation: $K = ma$ has dimensions $[M L T^{-2}]$, while kinetic energy has dimensions $[M L^2 T^{-2}]$.

5. In scientific notation, what is the order of magnitude of the Earth's diameter if it is 1.28×10^7 m?

- A. 6 B. 7
C. 8 D. 5 (B)

Explanation: The order of magnitude is the exponent of 10 in scientific notation, which is 7.

6. The unit 'steradian' is used to measure :

- A. Plane angle B. Solid angle
C. Mass density D. Surface tension (B)

Explanation: Steradian is the SI unit of solid angle.

7. Which arithmetic operation rule is applied for significant figures in multiplication and division?

- A. Least number of decimal places
B. Most significant figures
C. Least significant figures
D. Highest number of digits (C)

Explanation: The result should retain as many significant figures as the original number with the least significant figures.

8. What is the dimensional formula for force?

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

Explanation: Force = mass \times acceleration $\rightarrow [M] \times [L T^{-2}] = [M L T^{-2}]$.

9. Which of the following statements about dimensional analysis is true?

- A. It can derive exact numerical constants.
B. It verifies unit conversions only.
C. It checks dimensional consistency of equations.
D. It replaces experimental data. (C)

Explanation: Dimensional analysis is useful for checking the dimensional consistency or homogeneity of equations.

10. The density of a substance measured as 5.74 g in 1.2 cm^3 should be reported with how many significant figures?

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

Explanation: The result should match the measurement with the least number of significant figures, which is $1.2 \text{ cm}^3 \rightarrow$ 2 significant figures.