

Name: _____ Date: _____

Answer Key: Neon Horizons and Precise Measures: A 12th Grade Senior Science Quiz

Evaluate foundational SI standards and calibration protocols through high-level recall of luminosity, thermodynamic scales, and architectural-grade measurement errors.

1. In the International System of Units (SI), which base unit is defined by the fixed numerical value of the luminous efficacy of monochromatic radiation?

Answer: D) Candela

The candela (cd) is the SI base unit for luminous intensity, defined by the radiant intensity in a given direction from a source emitting monochromatic radiation of a specific frequency.

2. The Kelvin scale is an absolute scale, meaning it does not use 'degrees' in its notation.

Answer: A) True

Unlike Celsius or Fahrenheit, Kelvin is a thermodynamic scale where the unit is simply the 'kelvin' (K), not 'degrees kelvin'.

3. When a researcher repeatedly obtains the same value during an experiment, but that value is far from the theoretical target, the data is described as ____.

Answer: B) Precise but not accurate

Precision refers to the repeatability and consistency of measurements, whereas accuracy refers to how close they are to the true or accepted value.

4. Which of the following units is derived by combining the SI base units for mass, length, and time to measure force?

Answer: C) Newton

A Newton is defined as $1 \text{ kg}\cdot\text{m}/\text{s}^2$, utilizing the three base units of kilograms, meters, and seconds.

5. To convert the flow of electric charge into standard units, one would measure the ____.

Answer: C) Ampere

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The ampere is the SI base unit used to measure electric current, representing the rate of flow of electrons.

6. The mole is the SI unit used to measure the total mass of a chemical substance.

Answer: B) False

The mole (mol) measures the amount of substance (count of particles), not its mass; mass is measured in kilograms.

7. In advanced laboratory settings, 'Tare' or 'Zeroing' a digital balance is a primary step to eliminate which type of error?

Answer: B) Systematic error

Zeroing a scale addresses systematic errors, which are consistent, repeatable inaccuracies caused by the equipment itself.

8. The SI prefix used to signify a factor of 10 to the power of negative 9 (10^{-9}) is ____.

Answer: C) Nano

Nano denotes one-billionth of a unit, which is critical in fields like nanotechnology and molecular biology.

9. A measurement of 0.0050 meters contains four significant figures.

Answer: B) False

This measurement has only two significant figures (the 5 and the final trailing zero); leading zeros are not significant.

10. Which instrument is specifically designed to measure the amount of light falling on a surface in order to determine Luminous Intensity?

Answer: B) Photometer

A photometer measures the intensity of light or the optical properties of surfaces, often outputting data relevant to candelas.