

Analytical Measurement Uncertainty

Quiz-Answer Key

Passing score = 80% [Answers in RED]

Select the correct answer.

1. T F Customers will never ask for measurement uncertainty. (Answer: F)
2. T F The reference points of measuring are the units of measurement, the raw number, corrected results, and averages. (Answer: T)
3. T F A measurand is the same as the substance you are measuring, in other words, the analyte. (Answer: F)
4. T F The True Value is always known. (Answer: F)
5. T F Uncertainty is error in measurement. (Answer: F)
6. T F Measurement uncertainty includes the doubt that exists about the result of any measurement. (Answer: F)
7. T F Roughly 95% of all readings lie within 2 Standard deviations on either side of the mean. (Answer: T)
8. T F Uncertainty will be reported in the same unit as the analytical result. (Answer: T)

9. Measurement: (Answer: C)

- | | | | |
|--|--|----------|--------------------|
| A. Is a set of operations that determine the value of a quantity | B. Tells us about a property of something (i.e., how heavy, hot, or long an object is) | C. A & B | D. Neither A nor B |
|--|--|----------|--------------------|

10. Precision is when: (Answer: A)

- | | | | |
|-----------------------------------|---|---|------------|
| A. The measurement repeats itself | B. Every measurement value is close to the true value, but the same measurement is not repeated again and again | C. Instruments give the same answer over and over again | D. A and C |
|-----------------------------------|---|---|------------|

11. Which is the best way to calculate uncertainty?: (Answer: B)

- | | | | |
|---------------------------------|---|---|---------------------------|
| A. Use proficiency test samples | B. Perform according to your standard test method | C. Use standard deviation of long-term data collected from routine sample runs. | D. Utilize duplicate data |
|---------------------------------|---|---|---------------------------|

12. Match the correct term and definition: A. Measurand B. Standard deviation C. True Value D. Accuracy

- | | | | |
|---|---|--|---|
| <u>C</u> Actual amount of the analyte in a sample | <u>D</u> The ability of an instrument or testing process to repeat readings close to the true value of an analyte | <u>A</u> The particular quantity of the substance being measured, including the unit of measure and the matrix, e.g., "mg of lead in a cubic meter of air" | <u>B</u> A mathematical formula used to calculate the average distance that values in a set differ from the set's mean. |
|---|---|--|---|

13. Match the term with the correct meaning: A. Type A uncertainty B. Standard deviation C. Confidence level D. Offset

B The spread of numbers in a set

D A scale not set to zero

A Uncertainty evaluated by statistical methods

C The likelihood (expressed as a percentage) that the results of a test are real and repeatable, and not just random

