

QUIZ: Statistics: concepts and problems

1. To achieve an estimated percent standard deviation of 2%, _____ counts must be collected.
 - a) 400
 - b) 1,414
 - c) 2,500
 - d) 10,000

2. A measurement is made in which 2,500 counts are collected. There is a 95.5% probability that repeated measurements will yield between _____ and _____ counts.
 - a) 2,400; 2,500
 - b) 2,400; 2,600
 - c) 2,450; 2,500
 - d) 2,450; 2,550
 - e) 2,500; 2,555

3. Answer True/False to the following statements:
 - a) reliability depends upon agreement of observed value with true or actual value
 - b) reliability depends upon reproducibility of measured values
 - c) precision is a measure of both reliability and accuracy
 - d) accuracy is a measure of both reliability and precision
 - e) accuracy relates to agreement of observed and true values

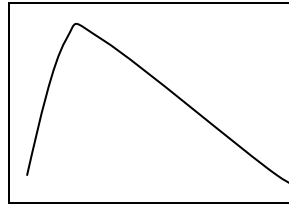
4. The following series of measurements was made: 11, 10, 10, 11, 10.5. The standard deviation for these measurements using an (N-1) weighting is:
 - a) 0.25
 - b) 0.50
 - c) 0.20
 - d) 0.447

5. The count rate of a sample is 400,000 counts/minute. What is the % error involved in counting this sample?
 - a) 0.0016 %
 - b) 0.16 %
 - c) 1.6%
 - d) 0.2%
 - e) none of the above

6. Consider the statistics formulae and statements below: mark each True or False

- a) the mean value of a series of numbers = $\Sigma X_i/n$ where n = number of values
- b) the mean value of a series of measurements always equals the median value
- c) the standard deviation of a series of measurements is represented by the formula

$$\sigma = \pm \sqrt{\frac{\sum (x_i - \bar{x})^2}{(N-1)}}$$



- d) the curve above is skewed to the left.
 - e) For the Gaussian distribution, 78.3% of all values will fall within $\pm 1\sigma$ of the mean
 - f) The lower the number of χ^2 , the better the correlation between expected and measured values
 - g) "mean $\pm 3\sigma$ " is used to set the normal range for lab values
 - h) The mode represents the middlemost value
 - i) The mean value of a series of numbers always equals the average value
 - j) for the Gaussian distribution, 95.5% of all values will fall within $\pm 2\sigma$ of the mean
7. A radioactive sample yields 8100 counts (including background). A background count of the same duration yields 1900 counts. The standard deviation of the difference between these counts is approximately:
- a. 43.59
 - b. 46.41
 - c. 90
 - d. 100
 - e. 122.33
8. A three-minute observation is made from which the count rate is found to be 300 counts per minute. The standard deviation of this count rate is:
- a. 30
 - b. 14
 - c. 17.3
 - d. 10
 - e. 9