Exercise– L3

Q3.1 **What type of errors remain after gross and systematic errors are minimized?**
A) Instrumental Errors
B) Observational Errors
C) Random Errors
D) Environmental Errors

Q3.2 **What is the purpose of statistical analysis in measurement?**
A) To completely eliminate all errors
B) To predict the outcome of measurements with random errors
C) To introduce new errors
D) To make measurements more complex

Q3.3 **Which of the following is NOT a form of statistical test used in measurement?**
A) Single-sample test
B) Multi-sample test
C) Parallel test
D) None of the above

Q3.4 **In a single-sample test, how are measurements taken?**
A) Using different test conditions
B) Using different instruments
C) By changing the observer each time
D) Under identical conditions but at different times

Q3.5 **What does a histogram represent in measurement analysis?**
A) A graphical representation of sample data distribution
B) A collection of systematic errors
C) The accuracy of an instrument
D) A comparison of different instruments

Q3.6 **What is the arithmetic mean used for in measurement?**
A) Calculating the most probable value of a measured quantity
B) Finding the smallest measurement
C) Identifying the most frequent measurement
D) Detecting systematic errors

Q3.7 **How is the arithmetic mean calculated?**
A) By adding all readings and dividing by their frequency
B) By taking the square root of all readings
C) By multiplying all values together
D) By selecting the highest reading

Q3.8 **What is the median of a data set?**
A) The sum of all readings
B) The middle value of an ordered data set
C) The most frequently occurring value
D) The value with the highest deviation

Q3.9 **If the number of data points is even, how is the median determined?**

A) By selecting the highest value
B) By averaging the two middle values
C) By choosing the most frequently occurring value
D) By calculating the deviation

Q3.10 **What is the mode of a data set?**
A) The value that appears most frequently
B) The average of all values
C) The smallest value in the set
D) The largest deviation from the mean

Q3.11 **What does the average deviation indicate in measurement analysis?**
A) The presence of gross errors
B) The absolute difference between the largest and smallest values
C) The precision of an instrument
D) The environmental effect on measurement

Q3.12 **Which of the following statements about average deviation is correct?**
A) A higher average deviation indicates higher precision
B) A lower average deviation indicates higher precision
C) The average deviation has no impact on precision
D) The average deviation only applies to gross errors

Q3.13 **What does the standard deviation measure?**
A) The absolute error in a system
B) The root mean square deviation from the mean value
C) The difference between the highest and lowest readings
D) The observer's influence on the data

Q3.14 **How is variance related to standard deviation?**
A) Variance is the square of the standard deviation
B) Variance is the square root of the standard deviation
C) Variance is unrelated to standard deviation
D) Variance is the difference between the highest and lowest values

Q3.15 **Why is standard deviation preferred over variance in measurement?**
A) Standard deviation has the same unit as the measured quantity
B) Standard deviation removes all errors
C) Variance cannot be calculated for small samples
D) Standard deviation is easier to compute

Q3.16 **What is absolute error?**
A) The sum of all deviations
B) The difference between the true value and the measured value
C) The ratio of error to the actual measurement
D) The largest deviation in a data set

Q3.17 **How is relative error expressed?**
A) As an absolute value
B) As a frequency distribution
C) As a percentage

D) As a sum of all readings

Q3.18 **Why is relative error important in measurement?**
A) It allows comparison between different measurements
B) It reduces the impact of observer errors
C) It eliminates random errors
D) It increases the precision of measurements

Q3.19 **What happens if random errors are ignored in statistical analysis?**
A) The precision of an instrument increases
B) The accuracy of the measurement may decrease
C) The absolute error remains unchanged
D) The variance becomes zero

Q3.20 **How can statistical analysis improve measurement accuracy?**
A) By selecting only the highest readings
B) By eliminating systematic errors entirely
C) By increasing the variance of data
D) By averaging out random errors over multiple readings

Answers

Question	Answer
Q3.1	C
Q3.2	B
Q3.3	C
Q3.4	D
Q3.5	A
Q3.6	A
Q3.7	A
Q3.8	B
Q3.9	B
Q3.10	A
Q3.11	C
Q3.12	B
Q3.13	B
Q3.14	A
Q3.15	A
Q3.16	B
Q3.17	C
Q3.18	A
Q3.19	B
Q3.20	D