

Construction and Industry

ASQ-LSSBB
Certified Lean Six Sigma Black Belt (CLSSBB)

Questions And Answers PDF Format:

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Question: 1

Which of Altshuller's eight laws for system development asserts that functions will tend toward simplicity and efficiency?

- A. Law of transition to a super system
- B. Law of increasing substance-field involvement
- C. Law of increasing ideality
- D. Law of harmonization

Answer: C

Explanation:

Altshuller's law of increasing ideality asserts that functions will tend toward simplicity and efficiency. Genrich Altshuller is famous for devising eight basic laws of system development, which form the philosophical core of his theory of inventive problem solving (TRIZ). These laws were created to solve engineering problems, though Altshuller contended that they could be applied in any situation. The law of increasing ideality is essentially an optimistic vision of the evolution of functions over time. The law of transition to a super system asserts that the individual solutions created for specific systems will eventually become components of a larger, comprehensive system. The law of increasing substance-field involvement asserts that engineers will treat design problems as two individual materials interacting through a field, and the results of these interactions will be system improvements. The law of harmonization suggests that, as a system improves, energy will be transferred throughout it more efficiently.

Question: 2

In an analysis of variance, how is the F statistic used?

- A. To compare the mean square treatment with the mean square error
- B. To estimate the process average
- C. To find the variation within each subgroup
- D. To find the variation between different subgroups

Answer: A

Explanation:

In an analysis of variance, the F statistic is used to compare the mean square treatment with the mean square error. The mean square treatment is the average variation between the subsets, while the mean square error is the sum of the squares of the residuals. In order to trust the results of the F statistic, one must assume that the subsets have a normal distribution and unequal variance. The variation within each subgroup is calculated by taking repeated samples from the

subgroup. The variation between different subgroups is found by comparing the averages of each subgroup.

Question: 3

In a numerical matrix diagram using a ten-point scale, which of the following values would indicate the strongest relationship?

- A. 9
- B. $1/10$
- C. 1
- D. $-1/5$

Answer: B

Explanation:

In a numerical matrix diagram, a value of $1/10$ would indicate the strongest relationship. Numerical matrix diagrams assign relationships values on a scale to indicate the strength of the interactions between variables. This diagram indicates the direction of the relationship by expressing the value as either a whole number or a fraction: That is, on a 10-point scale, a 10 would indicate the strongest possible relationship in one direction and $1/10$ would indicate the strongest possible relationship in the other. Therefore, a value of $1/10$ would indicate a stronger relationship than a value of 9. Negative values do not appear on a numerical matrix diagram.

Question: 4

If there are 32 observations in an experiment, it is typical to run autocorrelations from

- A. lag 4
- B. lag 8.
- C. lag 16.
- D. lag 32.

Answer: B

Explanation:

If there are 32 observations in an experiment, it is typical to run autocorrelations from lag 1 to lag 8. The basic calculation for the number of autocorrelations in an experiment is lag 1 to lag $x/4$, in which x is the number of observations. Because there are 32 observations in this experiment autocorrelations should run from lag 1 to lag 8. The lag is the difference between correlated observations. In lag 1, for instance, observation 1 is correlated with observation 2, observation 2 is correlated with observation 3, observation 3 is correlated with observation 4, and so on. In lag 8, observation 1 would be correlated with observation 9, observation 2 with observation 10, observation 3 with observation 11, and so on. An experiment with 32 observations would include all of the intervening correlations between lag 1 and lag 8 (i.e., lags 2 through 7).

Question: 5

Which of the following is a disadvantage of using enumerative statistics?

- A. It is difficult to determine whether the samples are representative.
- B. These statistics do not produce an assumed distribution.
- C. They cannot be applied to process baseline estimation.
- D. Values are drawn from a static population.

Answer: D

Explanation:

One disadvantage of using enumerative statistics is that values are drawn from a static population. If a dynamic process is to be measured, as is often the case in Six Sigma, it is necessary to use analytical statistics. The other answer choices allude to advantages of enumerative statistics. For instance, one advantage of enumerative statistics is that they make it easy to determine whether samples are representative. A representative sample is one extracted from the population without any bias. Enumerative statistics provide an assumed distribution as well as a confidence level and a set of confidence intervals. Finally, enumerative statistics may be applied to process baseline estimation, namely for the purpose of assessing random samples.

Question: 6

Which distribution is appropriate for a continuous set of data with a fixed lower boundary but no upper boundary?

- A. Johnson
- B. Exponential
- C. Normal
- D. Lognormal

Answer: D

Explanation:

A lognormal distribution is appropriate for a continuous set of data with a fixed lower boundary but no upper boundary. In most cases, the lower boundary on a lognormal distribution is zero. These distributions can be tested with a goodness-of-fit test. A Johnson distribution is more appropriate for continuous data that, for whatever reason, is inappropriate for a normal or exponential distribution. An exponential distribution is appropriate for any set of continuous data, though these distributions are most often used for frequency data. A normal distribution is appropriate for a set of continuous data with neither an upper nor a lower boundary. The normal distribution follows the pattern of the classic bell curve.

Question: 7

In metrology, what is the degree to which a measurement can be compared to a known standard with confidence called?

- A. Traceability
- B. Measurement uncertainty
- C. Calibration
- D. Engineering tolerance

Answer: A

Explanation:

In metrology, the degree to which a measurement can be compared to a known standard with confidence is called traceability. Experts on measurement are aware that every gauge is to some extent inaccurate (i.e., it contains measurement uncertainty), but it is important that these inaccuracies themselves be measurable. Six Sigma projects require a number of different measurements taken at different times and in different conditions, and it is essential that these measurements have essentially the same level of traceability.

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