Lean Six Sigma Green Belt (LSSGB) - LSSGB Simulation IASSC Test Paper 2

Q1. If the chance that any one of five telephone lines is busy at any instant is 0.01, then what is the probability that all the lines are busy?

SELECT THE CORRECT ANSWER

A. (0.01)^4
B. (0.01)^5
C. (0.01)^6
D. (0.01)^10

Correct Option:B
EXPLANATION:N = 5, p = 0.01, x = 5 Apply Standard formula for Binomial Distribution. Thus, option b is the correct answer.

Q2. Who should complete the control phase after the successful completion and implementation of the first four phases of DMAIC?

SELECT THE CORRECT ANSWER

A. The green belt alone; the project has been successfully completed.
B. The process owner alone; it is his responsibility to take the project from here.
C. The process owner and the Green Belt together should complete the control phase.
D. The complete team is the most desirable option.

Correct Option:D
EXPLANATION : The control phase should be completed by the entire team. Control is not an insignificant phase of the DMAIC process. The green belt or the process owner alone may not have the ability and knowledge to structure the last control step. So option d is correct.

Q3. To increase the power of the experiments, what is the best choice in the hands of a Six Sigma team?

SELECT THE CORRECT ANSWER

A. Increase Sample Size
B. Reduce Sample Size
C. Reduce Significance level
D. All of the above

Correct Option:A
EXPLANATION :Options b and c are not serious considerations, and thus option d can be ruled out. Conceptually, increase in sample size increases the possible accuracy of the experiment, and thus an increase in power. So, option a is the correct answer.

Q4. Which of the techniques used in DOE helps you in eliminating errors due to nuisance factors?

SELECT THE CORRECT ANSWER

A. Replication
B. Blocking
C. Randomization
D. Coding

Correct Option:B
EXPLANATION:By creating blocks in an experiment, you can eliminate the errors due to nuisance factors and thus option b is the correct answer.

Q5. Hypothesis testing is usually done to:

SELECT THE CORRECT ANSWER

A. Statistically validate if a sample mean belongs to the population

B. Statistically validate if means of two groups are the same or if they are significantly different
C. Statistically validate if variances of two groups are the same or if they are different.
D. All of the above

Correct Option:D
EXPLANATION : Statistically validate if a sample mean does belong to the population, find if means of two groups are the same or if they are significantly different, and validate if variances of two groups are the same or if they are different. Option d is the correct answer.

Q6. What is the concept behind PDCA?
SELECT THE CORRECT ANSWER
A. The Deming/Shewhart cycle
B. Process flow
C. Continuous improvement
D. Satisfying suppliers

Correct Option:C
EXPLANATION:The key question phrase is "concept behind." Option b is inappropriate and does not fit the question. Option a would be correct if the question requested another name for PDCA. Answer option d could be one of the number of potential positive outcomes of this activity. However, the concept behind and objective of PDCA is that of continuous improvement.

Q7. What are the six experiments called while performing one experiment with five repetitions?
SELECT THE CORRECT ANSWER
A. Randomization
B. Replications
C. Planned grouping
D. Sequential

Correct Option:B
EXPLANATION:Repeated trials or replications are often conducted to estimate the pure trial-to-trial experimental error so that lack of fit may be evaluated. Randomization frees an experiment from the environment and other biases. Sequential experiments are conducted one after another, not all at the same time. Adjustments may be made in the experimentation based upon the knowledge obtained. Almost any DOE contains planned grouping. So answer option b is correct.

Q8. Which type of chart is used for small shifts in variation?
SELECT THE CORRECT ANSWER
A. Xbar
B. p
C. c
D. CUSUM

Correct Option:D
EXPLANATION:The other charts are traditional control charts that are designed to identify significant shifts in process variation, while the CUSUM chart is designed to show small variation shifts.

Q9. What are the distinct types of variation that are noted down in control charts?
SELECT THE CORRECT ANSWER
A. Special and assignable
B. Random and chance
C. Chance and assignable
D. Normal and random

Correct Option:C

EXPLANATION : Chance and assignable are the two varieties of variation. Chance variation is also referred to as normal or random (among others). Assignable variation is also called special or non-normal. So option c is correct.

Q10. Which of the following is an advantage of the production of a product in large lots?
SELECT THE CORRECT ANSWER
A. Machine efficiencies
B. Customer delivery lead times
C. Product transportation
D. Product quality

Correct Option:A
EXPLANATION : According to the proponents of lean manufacturing and continuous flow, options b, c, and d are all disadvantages. For large lot processing delivery lead times increases, transportation of products increases, and products have more potentiall for damage. Option a is generally recognized as the main advantage of large batch runs that may be more than offset by the disadvantages. So option a is the correct choice.

Q11. A sample is to a statistic as a population value is to a:
SELECT THE CORRECT ANSWER
A. Sample
B. Unit
C. Parameter
D. Measurement

Correct Option:C
EXPLANATION : A statistic is derived from a sample. A parameter is derived from a population. So option c is correct.

Q12. A sample is to a statistic as a population value is to a:
SELECT THE CORRECT ANSWER
A. Sample
B. Unit
C. Parameter
D. Measurement

Correct Option:C
EXPLANATION : A statistic is derived from a sample. A parameter is derived from a population. So option c is correct.

Q13. Historically, the number of flaws in the finish of surface has an average of 0.45. What is the probability of a randomly selected item having more than one defect in the surface finish?
SELECT THE CORRECT ANSWER
A. 0.0755
B. 0.2869
C. 0.6376
D. 0.3624

Correct Option:A
EXPLANATION : The Poisson distribution is used to model rates. The probability of exactly "r" events occurring can be computed using the Poisson distribution shown below. Entering values as r = 0 and myu value = 0.45 in the required equation gives the probability of exactly zero defects as 0.6376. Entering values as r = 1 and myu value = 0.45 in the same equation gives the probability of exactly 1 defect as 0.2869. The probability of less than 2 defects is 0.6376 + 0.2869 = 0.9245. Thus, the probability of more than 1 defect is 1 - 0.9245 = 0.0755. So answer choice a is correct.

Q14. Why are scatter diagrams are useful in problem-solving?

SELECT THE CORRECT ANSWER

A. They display the significant few.
B. They eliminate the trivial many.
C. They show relationships between variables.
D. They highlight assignable causes.

Correct Option:C

EXPLANATION : This question requests a positive response. Options a and b describe the Pareto diagram. Option d is one advantage of control charts (perhaps histograms as well). A scatter diagram depicts the relationship between variables. Specifically, an input variable may have an effect on an output variable. So answer option c is correct.

Q15. The advantage of using the modern designed method of experimentation, rather than the classical OFAT, is that:

SELECT THE CORRECT ANSWER

A. Everything is held constant except the factor under investigation.
B. Experimental error is recognized but need not be stated in quantitative terms.
C. Fewer terms and measurements are needed for valid and useful information.
D. The sequence of measurement is often assumed to have no effect.

Correct Option:C

EXPLANATION : The key to this question is the meaning of the word 'classical'. To most authors, this term refers to varying one factor at a time (OFAT) while holding all other factors constant. Although this approach may work for very simple problems, it causes havoc with moderately complex systems. The fixed factors do vary, which can waste time, effort, and money. This traditional approach can yield invalid or inconclusive results. Modern design experimentation (including fractional factorials, improved three factor designs, and Latin square logic) squeeze a large amount of valid information from a few trials. Option c is correct.

Q16. What does ANOVA stands for?

SELECT THE CORRECT ANSWER

A. Analysis of Variance
B. Analysis of Variables
C. Accuracy of Variance
D. Analysis and Validation

Correct Option:A

EXPLANATION : ANOVA stands for Analysis of Variance. Option a is the correct answer.

Q17. Which of these quality tools would NOT be expected to be used during the results confirmation stage of a problem solution ?

SELECT THE CORRECT ANSWER

A. Flow chart
B. Pareto diagram
C. Histogram
D. Control chart

Correct Option:A

EXPLANATION:Note that a negative response is requested. The results confirmation stage uses performance data collection and analysis tools such as check sheets, Pareto diagrams, histograms, and control charts. The flow chart is normally used earlier in the problem-solving process, often to help define the problem. Answer a is the suitable choice.

Q18. If 6 consecutive samples were taken from a process and precisely measured, you can still expect differences. What type of variation would be the most difficult one to determine?

SELECT THE CORRECT ANSWER

A. Lot-to-lot variation
B. Piece-to-piece variation
C. Inherent process variation
D. Error of measurement

Correct Option:A

EXPLANATION : The small sample size would make it impossible to give a high level of confidence in the results. However, inherent process variation, piece-to-piece variation, and measurement error are obtainable. Lot-to-lot variation would not be detectable unless carefully planned for (which is not indicated in the question). So option a is correct.

Q19. Which of the following inference tests does NOT require the knowledge of a test or population variation?

SELECT THE CORRECT ANSWER

A. t test
B. Paired t test
C. z test
D. Chi-square test

Correct Option:D

EXPLANATION : Note that a negative response is requested. All of the above require population or sample variance (or standard deviation) except the chi-square test (with sup6 2 unknown). Option d is correct.

Q20. Which of the following is the LEAST likely candidate to assist in the problem definition stage of Six Sigma?

SELECT THE CORRECT ANSWER

A. CTQ trees
B. Pareto analysis
C. Product yield data
D. Control charts

Correct Option:D

EXPLANATION : Note that a negative response is requested. Items like CTQ trees, Pareto, yield data, customer feedback, and so on are useful for project definition. Control charts occur much later in the DMAIC cycle. So answer d is the correct choice.

Q21. What is the name of the condition if you are running a 7-4 fractional experiment? You know factors A, B, C, D, and E are independent of each other, but you suspect factors F and G are not independent. You conducted a small sub-experiment and discovered a high correlation between factors F and G.

SELECT THE CORRECT ANSWER

A. Collinearity
B. Confounded
C. Correlation
D. Covariates

Correct Option:A

EXPLANATION : Having two variables that are highly correlated in the experimental model will make it difficult or impossible to detect which factor really affects the response. This condition is called collinearity. The correct answer is option a.

Q22. If P(A) is 0.6 and P(B) is 0.5 and the probability of either event happening is 0.85, what is the probability of both the events occurring?

SELECT THE CORRECT ANSWER

A. 0.25
B. 0.3
C. 0.35
D. 0.4

Correct Option:A
EXPLANATION : 0.85 = P(A) + P(B) - P(A&B) = 0.6 + 0.5-0.85 = 0.25. Thus, option a is the correct answer.

Q23. A process has high variability and an off-centered mean. What is the first action the team needs to take?
SELECT THE CORRECT ANSWER
A. Center the mean
B. Reduce Variations
C. Increase the specifications
D. None of the above

Correct Option:A
EXPLANATION : For this process, centering the mean will bring a lot of the non-conforming possibilities within the specification limits. Option a is the answer.

Q24. What is the use of Scatter Diagrams?
SELECT THE CORRECT ANSWER
A. Control the process
B. Display the order of tasks or events
C. Display correlation
D. Identify root causes

Correct Option:C
EXPLANATION : Control charts usually do the process controlling. A display of tasks or events may be accomplished with a flow chart or checklist. Cause-and-effect diagrams can help identify root causes. Scatter diagrams are used to display correlation. So option c is correct.

Q25. Five samples are drawn out of a population of 200, with each sample being of size 5. The sample means are 2, 2.5, 3, 2.6, and 4. What is the sample mean?
SELECT THE CORRECT ANSWER
A. 2.8
B. 3
C. 3.2
D. 3.4

Correct Option:A
EXPLANATION : According to CLT, the sample mean is the mean of all the sample means. Taking an average of all the sample means, the answer is 2.82 which is close to 2.8. Option a is correct.

Q26. In IT sector, time and effort spent in testing the software, fixing bugs, and retesting would be considered as what type of waste?
SELECT THE CORRECT ANSWER
A. Waiting
B. Over Production
C. Defects
D. Over Processing

Correct Option:C
EXPLANATION ; Any effort spent on testing, bug fixes, and retesting would be considered as waste of type defects. If this was done right the first time, we would not have this waste.

Q27. What is the need to plot data points on the least squares line if a probabilistic regression model exists?

SELECT THE CORRECT ANSWER

A. To visually present the relationship to others
B. To check for fit; there may be a calculation error
C. No rational reason for doing so
D. To permit a projection outside of the test area

Correct Option:B

EXPLANATION : The best answer is b. There may be a mathematical error. The second best answer is a. Answer option c is incorrect and option d is always risky.

Q28. A team of Six Sigma has reached the control stage of DMAIC. The team has successfully reduced the defect of fabric critical stains from 73 to 1 per fabric roll. Now what type of control chart should the team recommend?

SELECT THE CORRECT ANSWER

A. A control chart based on the normal distribution such as the X-bar chart
B. A control chart based on the Poisson distribution such as the u-chart
C. A p-chart based on the binomial distribution
D. An np chart based on the binomial distribution

Correct Option:B

EXPLANATION : All four answers refer to valid control charts, but only answer B recognizes the Poisson nature of the improvement achieved. Critical stains are defect counts which are descriptive of the Poisson distribution. All other chart options are improper applications. Option b is correct.

Q29. What would be considered the most important element in the deployment of Six Sigma?

SELECT THE CORRECT ANSWER

A. Training
B. Organizational structure
C. Management support
D. Reward and recognition

Correct Option:C

EXPLANATION : All of the answer choices are key Six Sigma elements. However, the question states the "most important element." Management support is the most important element listed.

Q30. What is the attempt to reduce the impact of human error in a process called?

SELECT THE CORRECT ANSWER

A. Poka-yoke
B. Jidohka
C. Kaizen
D. Muda

Correct Option:A

EXPLANATION : Kaizen means continual improvement. Jidhoka is a kind of visual board. Muda means waste, while Poka-Yoke is said to be mistake-proofing of a process. So option a is correct.

Q31. What is the major weakness of the one-factor-at-a-time experimental strategy?

SELECT THE CORRECT ANSWER

A. It offers no ability to vary factors together.
B. It fails to account for interactions between factors.
C. It can be more costly to conduct.
D. It is less efficient than designed experiments.

Correct Option:B
EXPLANATION : All the items present good arguments against the one-factor-at-a-time testing. However, the major disadvantage is the failure to account for interactions. So answer b is correct.

Q32. Process capability (Cp) describes a process, often in a stable manufacturing environment, which leads to the production of a product that conforms to client and design specifications. What will be the Cp value of an ideal process?

SELECT THE CORRECT ANSWER

A. Greater than 1 (>1)
B. Less than 1 (<1)
C. Equal to 1
D. Within 1 standard deviation of mean

Correct Option:A
EXPLANATION : An ideal process will have a Cp value > 1 in a stable environment. Option a is the correct answer.

Q33. What does OEE stands for?

SELECT THE CORRECT ANSWER

A. Overall Equipment Effectiveness
B. Overall Estimation Effectiveness
C. Overall Equipment Estimation
D. Overall Effective Estimation

Correct Option:A
EXPLANATION : OEE stands for Overall Equipment Effectiveness.

Q34. The determination of temporal variation in multi-vari charting means:

SELECT THE CORRECT ANSWER

A. Variation within piece
B. Variation over time
C. Variation piece-to-piece
D. Variation within batch

Correct Option:B
EXPLANATION : This is basically a definition related question. Temporal variation means variation over time. So option b is correct.

Q35. Which of the following pairs is the most useful in preparing control charts, when used together, for variables data?

SELECT THE CORRECT ANSWER

A. AQL, p-bar
B. p, n
C. X-bar and R
D. R, sigma

Correct Option:C
EXPLANATION : An X-bar and R chart are represented best by variables data. Options a and b list attribute data quantities. The two values in option d are measures of dispersion and are not used together in control charting. So option c is correct.

Q36. Which of the following describes internal failure costs?

SELECT THE CORRECT ANSWER

A. The economic costs associated with a catastrophic failure of an internal subsystem
B. The unavoidable quality system costs associated with the production of any product or service

C. The opposite of external failure costs
D. The costs resulting from a nonconformance detected before a product or service is provided

Correct Option:D
EXPLANATION
The nonconformance costs are related to processes that do not match the customer expectations and hence relate to internal failure costs.

Q37. Choose the control chart that is used to monitor discrete data in Lean Six Sigma Green Belt?
SELECT THE CORRECT ANSWER
A. p Chart
B. I -MR Chart
C. X Chart
D. R Chart

Correct Option:A
EXPLANATION : p Chart is the control chart that is used to monitor discrete data in Lean Six Sigma Green Belt.

Q38. If an experiment has an alias, you could say that the two factor effects are:
SELECT THE CORRECT ANSWER
A. Confounded
B. Blocked
C. Misnamed
D. Mixtures

Correct Option:A
EXPLANATION : A design alias implies that the two factor effects are confused or confounded with each other. So option a is correct.

Q39. Why would a Six Sigma practitioner use an EWMA chart?
SELECT THE CORRECT ANSWER
A. To identify special cause variation
B. To identify common cause variation
C. To identify small shifts in variation
D. To take advantage of the fact that it's easier to use

Correct Option:C
EXPLANATION : An Exponential Weighted Moving Average, or EWMA, chart is primarily used to indicate small shifts in process variation.

Q40. What is the definition of Inventory type of waste?
SELECT THE CORRECT ANSWER
A. Storing parts at other location
B. Any supply in excess to process requirements necessary to produce goods or services just-in-time
C. Wrong parts in inventory
D. Finding and removing defective inventory from the stock

Correct Option:B
EXPLANATION : Inventory type of waste refers to any supply in excess to process requirements necessary to produce goods or services just-in-time. So the correct answer is option b.

Q41.Which type of control chart is ideal for destructive testing?
SELECT THE CORRECT ANSWER
A. X bar chart

B. p chart
C. I chart
D. u chart

Correct Option:C
EXPLANATION ; The control chart that works best for destructive testing is an I chart since only one unit is required to plot results at a sing point in time.

Q42. Which of the following is NOT a direct benefit of a Six Sigma project?
SELECT THE CORRECT ANSWER
A. Helps improve Cost of Quality
B. Helps improve Customer Satisfaction
C. Helps improve Supplier Quality
D. Helps improve market share

Correct Option:C
EXPLANATION : Six Sigma project helps in improving COQ, customer satisfaction, and also market share by increase in number of customers. Improving supplier quality is not a direct benefit of a Six Sigma project thus option c is the correct incorrect answer.

Q43. When put together, what do Repetition and Replication help the Six Sigma team determine?
SELECT THE CORRECT ANSWER
A. Short-term variability
B. Long-term variability
C. Both A and B
D. Neither A nor B

Correct Option:C
EXPLANATION : Repetition helps in determining short-term variability and Replication helps with long-term variability. Put together, they help in determining both. Thus, option c is the correct answer.

Q44. Which of the following statements is NOT true with regard to regression analysis?
SELECT THE CORRECT ANSWER
A. The coefficient of determination ranges from 0 to 1.
B. The correlation coefficient ranges from -1 to 1.
C. The higher the coefficient of determination, the better the fit.
D. Least squares is required to determine the best fit straight line.

Correct Option:D
EXPLANATION ; Regression is a method of fitting a model to data. Least squares is the most common procedure, but other procedures are also available. The correlation coefficient, r, is a measure of the strength of the correlation. When r = 1, there is perfect positive correlation, and when r = -1, there is perfect negative correlation. The coefficient of determination, r squared, represents the portion of the variability in the data explained by the regression model. Answer option d is the correct choice.

Q45. What set of basic quality tools would be most applicable for a work team to use when there is a desire to follow procedures and work instructions more closely?
SELECT THE CORRECT ANSWER
A. Pareto and affinity diagrams
B. Data sheets and histograms
C. Checklists and flow charts
D. Fishbone and control charts

Correct Option:C

EXPLANATION : Histograms, fishbone charts, control charts, Pareto diagrams, and affinity diagrams have no application as memory aids. Data sheets, checklists, and flow charts might offer an advantage. Only answer choice c offers two of these tools. So option c is correct.

Q46. Variable control chart subgroup sizes are generally 3, 4, 5, or 6 for all of the following reasons EXCEPT:

SELECT THE CORRECT ANSWER

A. They are large enough so that averages of data will follow the normal distribution
B. They fit onto traditional chart paper very well
C. Larger sizes permit an opportunity for process changes within the subgroup
D. They permit a separation of within time from time-to-time variation

Correct Option:B

EXPLANATION : Note that a negative response is requested. The weakest selection is option b. Control chart paper was developed to support a logical control chart sample size. Sample sizes should not be chosen to fit a handy form. The other items have merit. So option b is the correct choice.

Q47. What is the variance for a distribution of means with a sample size of 36 and a population standard deviation of 3?

SELECT THE CORRECT ANSWER

A. 0.75
B. 0.5
C. 0.25
D. 1

Correct Option:C

EXPLANATION : Applying CLT principles, Sample Standard deviation = 3/sqrt(36) = 0.5 and sample variance is thus the square of standard deviation. Option c is the correct answer.

Q48. Which of the following is NOT an advantage of control charts?

SELECT THE CORRECT ANSWER

A. They can detect trends of statistical significance.
B. They provide straightforward, easily interpreted information.
C. They provide an ongoing measure of process capability.
D. They can detect special causes of variation.

Correct Option:B

EXPLANATION : Note that a negative response is requested. The advantages of control charts include their ability to detect trends of statistical significance, provide an ongoing measure of process capability, and detect special causes of variation. The disadvantage is that they can be difficult to interpret properly. So answer b is the correct.

Q49. What is the most important benefit of implementing Lean?

SELECT THE CORRECT ANSWER

A. Achieving elimination of waste
B. Achieving Continuous Flow
C. Achieving financial gains
D. Achieving reduction of NVA

Correct Option:B

EXPLANATION : Lean eliminates waste, helps in reduction of NVA, and also helps the company in achieving financial gains. But principally, the important benefit of implementing Lean is to achieve continuous flow of the product. Thus, option b is the correct answer.

Q50. A Six Sigma team has been created to improve the process in which a company takes orders for its products. Which of the following tools should the team use to determine all the potential pitfalls and the actual defects that occur?

SELECT THE CORRECT ANSWER

A. Process failure mode and effects analysis
B. Supplier input process output control
C. Process map
D. Design for Six Sigma

Correct Option:A

EXPLANATION : A Process Failure Mode Effects Analysis (PFMEA) is a structured analytical tool used by an organization, business unit, or cross-functional team to identify and evaluate the potential failures of a process. PFMEA helps to establish the impact of the failure, and identify and prioritize the action items with the goal of alleviating risk. It is a living document that should be initiated prior to the process of production and maintained through the life cycle of the product.

Q51. According to a national grocery store chain manager, only 6% of customers who have surveys mailed to their homes return them filled out completely. What is this type of sampling error called?

SELECT THE CORRECT ANSWER

A. Non-response error
B. Confidence interval
C. Lazy consumer error
D. Mailing error

Correct Option:A

EXPLANATION : Since 94% of the customers have not responded to the surveys, it is a non-response error.

Q52. Which approach talks about equipment effectiveness?

SELECT THE CORRECT ANSWER

A. Lean
B. TPM
C. Six Sigma
D. TOC

Correct Option:B

EXPLANATION : Total Productive Maintenance, or TPM, is focused on Overall Equipment Effectiveness (OEE), which completely focuses on equipment reliability and maintenance. So option b is the correct answer.

Q53. Which Six Sigma role is most likely to define objectives for an improvement team?

SELECT THE CORRECT ANSWER

A. Leader
B. Sponsor
C. Facilitator
D. Member

Correct Option:B

EXPLANATION : The team sponsor is often likely to define team objectives. The second best choice is the team leader, although this is usually not the case. Team facilitators and members do not define team objectives. Answer option b is correct.

Q54. What is accuracy?

SELECT THE CORRECT ANSWER

A. Getting consistent results repeatedly
B. Reading to one decimal greater than the reported dimension
C. Using the best measuring device available
D. Getting an unbiased true value

Correct Option:D
EXPLANATION : A review of measurement terminology is required. Getting consistent results repeatedly is precision. Reading to one decimal greater than the reported dimension has to do with the sensitivity of the device. Using the best measuring device available can be costly and unnecessary. The correct choice is getting an unbiased true value.

Q55. What should the Six Sigma Green Belt do in terms of actions if Cp = 1.3 and Cpk = 0.8?
SELECT THE CORRECT ANSWER
A. Center the mean
B. Reduce variations
C. Reduce variations and center the mean
D. Nothing

Correct Option:A
EXPLANATION : The variations seem to be under control as indicated by the Cp value. The change in Cp and Cpk could be because of shift in the mean, which needs to be centered. Option a is the correct answer.

Q56. Which of the following is used to test the equality of medians from two or more different populations?
SELECT THE CORRECT ANSWER
A. Mood's Median
B. Kruskal-Wallis
C. Friedman
D. 1 Sample Sign Test

Correct Option:A
EXPLANATION : The Mood's Median is a nonparametric test used to test the equality of medians from two or more different populations.

Q57. While plotting a multi-vari chart on the graph paper, what metric is used for the horizontal scale?
SELECT THE CORRECT ANSWER
A. Time
B. Count data
C. Variable data
D. Percentages

Correct Option:A
EXPLANATION : In multi-vari charting, time (or sample number in time sequence) is shown on the horizontal scale and a variable measurement (usually with locational identification) is shown on the vertical scale. So option a is correct.

Q58. What is the basic assumption of null hypothesis?
SELECT THE CORRECT ANSWER
A. That the variables are dependent
B. That the variables are independent
C. That the sample size is adequate
D. That the confidence interval is A± 2 standard deviations

Correct Option:B

EXPLANATION : Option d is a filler option. It is desirable that the sample size be adequate (option c), but sufficient information may not be available to determine an adequate sample size before testing. One assumption made in the analysis of variance of means is that the variables are independent. So answer b is correct.

Q59. Which of the following does an F distribution closely resemble?
SELECT THE CORRECT ANSWER
A. A t-distribution
B. A Chi-square distribution
C. An exponential distribution
D. A log normal distribution

Correct Option:B
EXPLANATION : The F statistic is the ratio of two sample variances (two chi-square distributions). It should come as no surprise that it resembles a chi-square distribution in appearance. So answer option b is correct.

Q60. In hypothesis testing, if someone stated one minus the level of confidence risk, then which of the following statistics would be under consideration?
SELECT THE CORRECT ANSWER
A. The alpha risk
B. The 1-alpha risk
C. The beta risk
D. The 1-beta risk

Correct Option:A
EXPLANATION : The first observation made would be that the experimenter is probably confused. If the statement is correct, then: 1-alpha risk = level of confidence or 1-level of confidence = alpha risk. So option a is correct.

Q61. Which of the following best defines "Overproduction" type of waste?
SELECT THE CORRECT ANSWER
A. Producing in excess of need or specified amount
B. Producing over and above the capacity of the machine
C. Parts produced over the specified measurements
D. Parts produced during over time shift

Correct Option:A
EXPLANATION : The definition of Over-Production type of waste is producing faster or an excess quantity than the internal or external customer needs.

Q62. A "pull" production system is a production system where you make as much product as you can regardless of whether the customer needs it or not.
SELECT THE CORRECT ANSWER
A. True
B. False

Correct Option:B
EXPLANATION : A Pull production system only make the amount needed to meet the customer's specific demands.

Q63. An engineer is considering a fractional factorial instead of a full factorial to analyze a process because of the large number of variables under study. Apart from the possibility of studying a large number of factors with relatively few experiments, what other characteristic will support a decision to use a fractional factorial instead?
SELECT THE CORRECT ANSWER

A. It is suspected that there are many interactions.
B. The process is well known and only the main factors are of concern.
C. A fractional factorial will determine the main effects curvature.
D. Blocking is necessary to account for nuisance factors in this study.

Correct Option:B
EXPLANATION : Answer options a and c are conceptually wrong. Options b and d are valid concepts but only option b responds to the question. A good reason to use a fractional factorial is that one knows the process and has no immediate concerns about factor interactions. Answer option b is correct.

Q64. In the theory of control charts, the distribution of the number of defects per unit very closely follows the:
SELECT THE CORRECT ANSWER
A. Normal distribution
B. Binomial distribution
C. Chi-square distribution
D. Poisson distribution

Correct Option:D
EXPLANATION : The normal distribution relates to variable data and not attribute data. The chi-square distribution is used to make inferences regarding population variances. The binomial distribution is assumed for defectives. The Poisson distribution is assumed for defects. So option d is correct.

Q65. What are the typical phases of Six Sigma-based Improvement methodology?
SELECT THE CORRECT ANSWER
A. DMAIC (Define, Measure, Analyze, Improve, Control)
B. PDCA (Plan, Do, Check, Act)
C. Reduce Variation
D. Sort, Stabilize, Shine, Standardize, Sustain, Support

Correct Option:A
EXPLANATION : The DMAIC (Define, Measure, Analyze, Improve, Control) cycle, an integral part of Six Sigma, is used for improvements.

Q66. Conceptually, which tool used in the Six Sigma DMAIC implementation resembles the Process Decision Program Chart?
SELECT THE CORRECT ANSWER
A. FMEA
B. Pareto Charts
C. VOC Analysis
D. QFD

Correct Option:A
EXPLANATION : Of all these tools, FMEA can be used to plan contingency, which is the primary purpose of PDPC. Option a is the correct answer.

Q67. Identify the post-improvement tool which would be most beneficial when generating fresh ideas after the results of an improvement process have been disappointing.
SELECT THE CORRECT ANSWER
A. A post-improvement capability analysis
B. A post-improvement brainstorming session
C. A follow-up FMEA study
D. A multi-vari re-analysis

Correct Option:B
EXPLANATION : Answer options a, c, and d are ideal for determining the effectiveness of various improvement activities. Brainstorming would be used to generate ideas if improvement results proved to be inadequate. Options b is correct.

Q68. What type of waste is "Patient is ready to be seen but doctor is not available"?
SELECT THE CORRECT ANSWER
A. Waiting
B. Defect
C. Overproduction
D. Underutilization

Correct Option:A
EXPLANATION : Patients waiting to see doctor is Waiting type of waste. If the doctor is waiting for patients, then it would be underutilization.

Q69. Identify the relationship between Waste and Defect.
SELECT THE CORRECT ANSWER
A. There's no relationship.
B. Waste is a type of Defect.
C. Defect is a type of waste.
D. Both terms can be used interchangeably.

Correct Option:C
EXPLANATION : According to TIMWOODS, which pertain to the 8 Wastes of Lean, Defect is definitely a type of Waste. Thus, option c is the correct answer.

Q70. While considering the stakeholder groups, which of the following terms is closely identified with the term "community"?
SELECT THE CORRECT ANSWER
A. Society
B. Government
C. External customers
D. Suppliers

Correct Option:A
EXPLANATION : All the options are a part of the local or global community. However, relative to stakeholder groupings, community and society are often used interchangeably. So answer option a is correct.

Q71. A scoop samples 100 units/trial. What must be the average number of defects for there to be an 80% chance that more than one defect will be found in the sample?
SELECT THE CORRECT ANSWER
A. 5.4
B. 4.75
C. 3
D. 1.8

Correct Option:C
EXPLANATION :
This question requires using the Poisson table in reverse. Note that more than one defect is desired. For the sample to contain more than one defect with an 80% probability, a table must be used to determine a 20% probability of 0 or 1. From the table, np=3.0. There must be three defects in the scoop. So option c is correct.

Q72. What is the key benefit of multi-vari charting?

SELECT THE CORRECT ANSWER

A. It keeps track of the time when measurements were made.
B. It graphically displays the variation in a process.
C. It assists in the breakdown of components of variation.
D. It is much easier to plot than most control charts.

Correct Option:C

EXPLANATION : Option d may or may not be true; this is a distractor choice. Options a, b, and c are true statements. However, the principal reason behind multi-vari charting is to breakdown the variation into components, such as positional, cyclical, and temporal so that improvements can be made. So option c is correct.

Q73. When a single gage is checked by comparing the results of different operators taken at different times, a reference is being made to the gage:

SELECT THE CORRECT ANSWER

A. Sensitivity
B. Accuracy
C. Precision
D. Reproducibility

Correct Option:D

EXPLANATION : This question requires a review of measurement terminology. Answer option a is incorrect since sensitivity is the ability to detect differences in measurement. Option b is incorrect because accuracy is an unbiased true value. Option c is incorrect since precision is getting consistent results repeatedly. Answer d is correct.

Q74. For 5 factors and 2 levels, the DOE setup has 16 runs. What type of experiment is being conducted?

SELECT THE CORRECT ANSWER

A. Half-fractional factorial
B. Full factorial
C. Quarter-fractional factorial
D. Response Surface

Correct Option:A

EXPLANATION : In this case, half-fractional factorial is conducted. The total number of runs for full factorial would be 32 (2^5 =32). If only 16 runs are set up, then it is half of the full model.

Q75. Which of the following control charts would best fit a process in which measurement data on a product is easily obtained?

SELECT THE CORRECT ANSWER

A. Run charts
B. Median charts
C. X-bar and R charts
D. p charts

Correct Option:C

EXPLANATION : Option a is incorrect because Run Charts are not control charts. Median charts are not as sensitive to process change as X-bar and R charts. Option b is not the best answer. The p charts (option d) are meant for attributes and not measurements. So option c is correct.

Q76. What is Takt Time?

SELECT THE CORRECT ANSWER

A. Time taken to create a unit
B. End to End time

C. Throughput time
D. Average customer demand time for an article

Correct Option:D
EXPLANATION : Lean production uses takt time as the rate at which a completed product needs to be finished to meet customer demand.

Q77. Which of the following is the only way to analyze variance by ranks?
SELECT THE CORRECT ANSWER
A. One-sample Wilcoxon
B. One-sample Size Test
C. Friedman Test
D. Kruskal-Wallis

Correct Option:D
EXPLANATION : From the options given, the Kruskal-Wallis test is the only one to analyze variance by ranks.

Q78. What are the factors that impact the shape of the t distribution? Select all that apply.
SELECT THE CORRECT ANSWER
A. Sample size
B. Degree of Freedom
C. Sample standard Deviation
D. Population mean

Correct Option:A, B
EXPLANATION : The shape of a t distribution is influenced by the sample size and the Degree of Freedom. So option 1 is correct.

Q79. What part of 5S promotes all work stations for a particular job being identical?
SELECT THE CORRECT ANSWER
A. Seiketsu (Standardize)
B. Non-Value Add
C. Seiso (Shine)
D. Seiri (Sort)

Correct Option:A
EXPLANATION : Seiketsu (Standardize) is the right answer. All work stations for a particular job should be identical. All employees doing the same job should be able to work in any station with the same tools that are in the same location in every station.

Q80. If process A, B, and C are working in series with their first pass yields as A = 94%, B = 98%, C = 99%, then the total DPU is:SELECT THE CORRECT ANSWER
A. 9 per 10
B. 9 per 1000
C. 9 per 100
D. 9 per 10000

Correct Option:C
EXPLANATION : A*B*C = 91.19%. TDPU = -ln(RTY) = 0.09 = 9 per 100

Q81. Which statistic can be used to determine the probability of variances occurring?
SELECT THE CORRECT ANSWER
A. Binomial Statistic
B. Poisson Statistic
C. Moving Average Statistic

D. Chi-Square statistic

Correct Option:D
EXPLANATION : The Chi-Square statistic can be used to determine the probability of variances occurring. Chi- square = (n-1)s2/sigma2

Q82. What should practitioners be very sensitive to while plotting Control charts?
SELECT THE CORRECT ANSWER
A. The type of control charts selected
B. The sub-group size chosen
C. The interpretation of the charts
D. All of the above

Correct Option:D
EXPLANATION : All the factors listed above are extremely important. Sp option d is correct.

Q83. To state that a model in an experimental design is fixed indicates that:
SELECT THE CORRECT ANSWER
A. The levels used for each factor are the only ones of interest
B. The levels were chosen from a fixed population
C. The equipment from which the data are collected must not be moved
D. The factors under consideration are qualitative

Correct Option:A
EXPLANATION : Answer choices b, c, and d are all filler options. Experimental design levels are established (or fixed) based on the best advice of people knowledgeable about the process. A balanced design is then considered only at those levels. Based upon analysis, factors may then be adjusted to other fixed levels for subsequent experimentation. The objective is to achieve optimum performance. Option a is correct.

Q84. In a single-factor ANOVA, the assumption of homogeneity of variances applies to:
SELECT THE CORRECT ANSWER
A. The variances within the treatment groups
B. The variances of the treatment groups
C. The total variance
D. All of the above

Correct Option:A
EXPLANATION : An underlying assumption in any analysis of variance of means is that homogeneity of variance applies to the variation within each factor (treatment). Statistical tests exist to test this homogeneity, but in ANOVA, the assumption is that the natural variation within each factor is the same. So option a is correct.

Q85. Using which of the following tools can basic information about data, such as central location, width, spread, and shape be visualized ?
SELECT THE CORRECT ANSWER
A. P charts
B. Affinity diagrams
C. Pareto diagrams
D. Histograms

Correct Option:D
EXPLANATION : This question requires basic quality tool knowledge and a review of the answers. Option a is incorrect because a p chart is an attribute control chart which records the proportion of non-conforming items. Option b is a tool showing the organized output from a

brainstorming session. Option c is a graphic representation of the cause-and-effect relationship among elements of a problem. The histogram is described in the question. Option d is correct.

Q86. Using which of the following tools can basic information about data, such as central location, width, spread, and shape be visualized ?

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Q87. Encot produces computer chips for large medical and technological corporations. To determine the number of defective chips from each batch of inspected products, what type of chart should its managers use?

SELECT THE CORRECT ANSWER

A. P chart
B. R Chart
C. C chart
D. X chart

Correct Option:A

EXPLANATION : The p chart is used when the data can only be whole numbers, as in counting; it is known as discrete data (also known as attribute data). Every item in the sample is evaluated for only the number of defects, flaws, or occurrences, etc.

Q88. Which of the 5S techniques is the first step in 5S implementation?

SELECT THE CORRECT ANSWER

A. Seiri (Sort)
B. Seiso (Shine)
C. Seiton (Stabilize)
D. Shitsuke (Sustain)

Correct Option:A

EXPLANATION : Seiri (Sort), is the first step in making things cleaned up, sorted, and organized. It starts out by sorting the necessary and the unnecessary items and remove the unnecessary items from the workplace.

Q89. The UCL and LCL on a traditional control chart are set how many standard deviations below and above the average?

SELECT THE CORRECT ANSWER

A. 2
B. 3
C. 4
D. 1

Correct Option:B

EXPLANATION : The control limits of a traditional control chart are set 3 standard deviations above and below the average.

Q90. Which of the following can a Six Sigma project reduce?
SELECT THE CORRECT ANSWER
A. Internal Failure Cost
B. External Failure Cost
C. Total Failure Cost
D. None of the above

Correct Option:C
EXPLANATION : Since internal failure cost and external failure cost are integral parts of the total failure cost, option c is the correct answer.

Q91. For a full factorial experiment with 23 treatments and 1 replicate, how many runs can you expect?
SELECT THE CORRECT ANSWER
A. 8
B. 16
C. 46
D. 32

Correct Option:C
EXPLANATION : 23 designs plus 1 replicate gives you 23+23. Since this is full factorial, we will include all of these, that is, 46.

Q92. Which tool is specifically designed to identify risks of a potential solution?
SELECT THE CORRECT ANSWER
A. Brainstorming
B. FMEA
C. Prioritization Matrix
D. Fish Bone

Correct Option:B
EXPLANATION : The other answer choices could be helpful but a FMEA is specially designed to identify risks.

Q93. After a solution pilot is deployed, what type of hypothesis test should be used?
SELECT THE CORRECT ANSWER
A. Proportion
B. Z test
C. 2 Sample t-Test
D. Paired t-test

Correct Option:D
EXPLANATION : A paired t-test is used for a dependent group and is the hypothesis test used to validate effectiveness of improvement efforts.

Q94. A sample _____ is used to make inferences about the population _____.
SELECT THE CORRECT ANSWER
A. Value; Parameter
B. Value; Statistic
C. Statistic; Parameter
D. Parameter; Statistic

Correct Option:C
EXPLANATION : A statistic belongs to the sample and parameter to the population. So option c is correct.

Q95. Who will be the primary user of the control plan?

SELECT THE CORRECT ANSWER

A. Six Sigma Team
B. Champions
C. Sponsor
D. Process Owner

Correct Option:D

EXPLANATION : The control plan is created to guide the process owners to maintain the improvements made during the Six Sigma project.

Q96. What is the appropriate mathematical model to describe the sampling distribution of the fraction defective in samples from a controlled process in which p bar = 0.05?

SELECT THE CORRECT ANSWER

A. The normal distribution
B. The binomial distribution in which p bar = 0.05
C. The binomial distribution in which p bar = 0.95
D. The exponential distribution

Correct Option:B

EXPLANATION : Options a and d refer to variables data. A binomial distribution for sampling focuses on defectives. In this case, p bar is given as 0.05 (or 5%). So answer choice b is correct.

Q97. For a process working at 3 Sigma level, how many opportunities out of one million are considered to lie outside of the specification limits provided by the customer?

SELECT THE CORRECT ANSWER

A. 233
B. 6210
C. 3.4
D. 66807

Correct Option:D

EXPLANATION : A 3 Sigma process has a total of 66807 defects. Option d is the correct answer. Using a Sigma Level Conversion table, a sigma level of 3 corresponds to a DPMO of 66807.

Q98. In which stage of a DMAIC approach should the Six Sigma team decide on making a Flow-chart or a Value Stream Map (Current and Future)?

SELECT THE CORRECT ANSWER

A. Define
B. Measure
C. Analyze
D. Improve

Correct Option:C

EXPLANATION : Typically, micro-level maps or process flowcharts are made in the Analyze stage. So c is the answer.

Q99. In terms of ease of understanding and implementation, which of the following tools is considered best to inform employees of their work roles?

SELECT THE CORRECT ANSWER

A. Job Description
B. Process Flow Maps
C. Written Instructions
D. Standardized Work Templates

Correct Option:C
EXPLANATION : Written Instructions are considered the easiest to comprehend by employees.

Q100. Which of these are categorized under Precision in a GAGE RR Study?
SELECT THE CORRECT ANSWER

A. Linearity and Accuracy
B. Repeatability and Linearity
C. Repeatability and Reproducibility
D. Bias and Linearity

Correct Option:C
EXPLANATION : Repeatability and Reproducibility show how precise the measurement system is. Thus, they are the best indicators of precision.