Lean Six Sigma Green Belt (LSSGB) - LSSGB Simulation ASQ Test Paper 1

Q1. Increasing the performance in a Six Sigma organization from 3 sigma to 4 sigma would reduce the defects per million opportunities by a factor of:

SELECT THE CORRECT ANSWER

A. 2
B. 8
C. 10
D. 16

Correct Option:C

EXPLANATION :The 4 sigma defect rate is 6210 ppm and the 3 sigma defect rate is 66807 ppm or a ratio of 1:10.76. So option c is the closest choice.

Q2. What is the inference of "Process is in control" according to Walter Shewhart?

SELECT THE CORRECT ANSWER

A. Process has assignable causes
B. Process has assignable and chance causes
C. Process has chance causes
D. Process has assignable or chance causes

Correct Option:C

EXPLANATION : The only time the process is said to be in control is when the common causes of variation contribute to the variability of the process. Option c is the correct answer.

Q3. One of the uses of recording check sheets is:

SELECT THE CORRECT ANSWER

A. Automating the charting of variable data
B. Collecting tally counts of attribute data
C. Identifying process variables
D. Creating process maps

Correct Option:B

EXPLANATION : Recording check sheets can be used to collect tally counts of attribute data. This can include machine, operator, characteristic, and so on. They are not used for the other listed choices. Option b is correct.

Q4. If P(A) is 0.6, P(B) is 0.5, Probability of either event happening together 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 correct.

Q5.A team project charter is essential for all of the following reasons, EXCEPT:

SELECT THE CORRECT ANSWER

A. It ensures the team champion will be supportive
B. It guides the team to focus on the appropriate problem
C. It leads to a solution that aligns with the organization's goals
D. It provides a complete history of the project

Correct Option:D
EXPLANATION : Please note that a negative response is requested. Options a, b, and c are valid reasons for a project charter. The project charter will be the initial starting point of a project and does not provide its total history. So answer d is the correct response.

Q6. 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 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.

Q7. Which of the following tools would be appropriate to collect the data to study the symptoms of a problem?

SELECT THE CORRECT ANSWER

A. Check sheet
B. Flow diagram
C. Force-field analysis
D. Activity network diagram

Correct Option:A
EXPLANATION : This ensures that all the required data has been identified and validated.

Q8. Which one of these items is NOT a type of standard set of waste?

SELECT THE CORRECT ANSWER

A. Over production
B. Taxes
C. Waiting
D. Transportation

Correct Option:B
EXPLANATION : Taxes are not one of the seven wastes. Taxes are regulatory obligation and cannot be considered as waste.

Q9. The probability of a train arriving on time and leaving on time is 0.8. The probability of the same train arriving on time is 0.84. The probability of this train leaving on time is 0.86. Given the train arrived on time, what is the probability it will leave on time?

SELECT THE CORRECT ANSWER

A. 0.93
B. 0.84
C. 0.88
D. 0.95

Correct Option:D

EXPLANATION:The solution to this problem involves conditional probability. The probability of event B occurring, given event A has occurred, is: Let event B be the probability the train leaves on time, and let event A be the probability of the train arriving on time. The intersection of events A and B is the probability of the train arriving and leaving on time. Thus, the probability of event B given event A has occurred is 0.8/0.84 = 0.9524. Option d is correct.

Q10. What is significance of the Seiso (Shine) phase of 5S methodology?
SELECT THE CORRECT ANSWER
A. To ensure the product packaging is good for selling
B. Packaging
C. Have clean workspace
D. Removing all the defects

Correct Option:C
EXPLANATION:The third stage of 5S is Seiso, called as Shine in English. In this stage, everything is kept clean and swept. Working in a clean environment enables workers to notice malfunctions in equipment such as leaks, vibrations, breakages, and misalignments.

Q11. 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.

Q12. In Six Sigma applications, Standard Deviation is referred to as difference from the:
SELECT THE CORRECT ANSWER
A. Target
B. Specification limits
C. Mean
D. Nearest fit value

Correct Option:C
EXPLANATION:Standard deviation is always referred to as difference from the mean. Option c is the correct answer.

Q13. Which of the following quality tools is used to rank all categories, making apparent the vital few and the trivial many?
SELECT THE CORRECT ANSWER
A. Flow charts
B. Control charts
C. Scatter diagrams
D. Pareto diagrams

Correct Option:D
EXPLANATION : Flow charts visually present a process showing the main steps, branches, and outcomes of that process. A scatter diagram visually displays the correlation between two or more variables. Control charts are used to detect changes in a predictable process and indicate when

adjustment is necessary. Options a, b, and c are incorrect. A Pareto diagram is used to show all categories by rank, indicating the vital few and the trivial many. So option d is correct.

Q14. A QFD diagram uses which of the following tools?
SELECT THE CORRECT ANSWER
A. Affinity Diagram
B. Tree Diagram
C. Relationship Matrix
D. Arrow Diagram

Correct Option:C
EXPLANATION:The integrator room, which correlates customer needs and service features, is in the form of an Interrelationship matrix. Option c is the correct answer.

Q15. Cancelling or nullifying suggestions or ideas is NOT a recommended practice in which of the tools:
SELECT THE CORRECT ANSWER
A. Multi-voting
B. Voting
C. Brainstorming
D. Prioritization meet

Correct Option:C
EXPLANATION : Cancelling or nullifying suggestions or ideas is NOT a recommended practice in Brainstorming.

Q16. 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 is 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.

Q17. What is the principle reason One Factor Experiments are not chosen to work with?
SELECT THE CORRECT ANSWER
A. They can miss interactions
B. They can mislead
C. They can give wrong results
D. They could involve too many experiments

Correct Option:A
EXPLANATION : All the options seem to be correct here, but the main reason why one-factor-at-a-time (OFAT) experiments are not done is because they miss interactions. So option a is the correct answer.

Q18. Which of these tools/techniques represent "continuous improvement"?
SELECT THE CORRECT ANSWER
A. Kaizen
B. Six Sigma
C. Lean

D. Kanban

Correct Option:A
EXPLANATION : The word kaizen means "continuous improvement." It is a system of continuous improvement in quality, technology, processes, company culture, productivity, safety, and leadership. It comes from the Japanese words ("kai") which means "change" or "to correct" and ("zen") which means "good."

Q19. 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.

Q20. In which of the following stages does the Team Leader acquire or play the role of a Coach?
SELECT THE CORRECT ANSWER
A. Forming
B. Storming
C. Norming
D. Performing

Correct Option:B
EXPLANATION : The team lead plays a unqiue role in each phase of Team's development. In the Storming phase the team leader plays the role of a Coach while the team is trying to figure out roles and responsibilities

Q21. What is said to be true when samples are drawn out of a population randomly?
SELECT THE CORRECT ANSWER
A. The sample mean is always the same as population mean
B. The sampling distribution approaches normality with increase in sample size
C. The sample standard deviation will be the same as population standard deviation
D. The sampling distribution would be triangular if population is distributed as triangular distribution

Correct Option:B
EXPLANATION : Although CLT states in one of its clauses that sample mean = population mean, it cannot be said with a degree of confidence at all times. Option c and d are not serious considerations. Option b is the correct answer.

Q22. 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.

Q23. Which of the following errors is typically associated with the notion, "False positive"?
SELECT THE CORRECT ANSWER
A. Type I error
B. Type II error
C. Type III error
D. Depends on the experiments

Correct Option:A
EXPLANATION : Take an example of a patient who wished to go for an HIV test. He was actually not suffering from the virus, but the tests revealed that he was. The test declared him positive on HIV, while he was not. Thus, False Positive, option a is right.

Q24. For a process working at 4 Sigma levels, the Rolled Throughput Yield is:
SELECT THE CORRECT ANSWER
A. 99%
B. 99.37%
C. 99.50%
D. 99.80%

Correct Option:B
EXPLANATION : Using the Sigma-RTY Conversion table, the answer is 99.37%.

Q25. In order to ensure data accuracy and integrity, which of the following should NOT be considered?
SELECT THE CORRECT ANSWER
A. Unnecessary rounding of data
B. Record production data in time sequence
C. Filter data for entry errors
D. Remove data based on a firm hunch that it is false

Correct Option:D
EXPLANATION : Note that a negative response is requested. Objective statistical tests should be used to remove outliers or other suspect data. Answer d is the correct choice.

Q26. 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. Therefore answer c is the correct option

Q27. What is Lean philosophy?
SELECT THE CORRECT ANSWER
A. Provide perfect value to the customer through a perfect value creation process that has zero waste
B. Continuous Improvement
C. Higher output by encouraging people to work hard and have targets
D. Reducing cost and improving purchasing power for the individuals

Correct Option:A
EXPLANATION ; Lean philosophy is to provide perfect value to the customer through a perfect value creation process that has zero waste, while cost reduction is not the main focus on Lean.

Q28. The opposite of an alpha risk in hypothesis testing is called:
SELECT THE CORRECT ANSWER
A. Beta risk
B. 1-beta risk
C. Level of confidence
D. 1-level of confidence

Correct Option:C
EXPLANATION : The opposite of the alpha risk is the 1-alpha risk, also called the level of confidence. Answer option c is the correct answer.

Q29. If the probability of a car starting on a cold morning is 0.6, and we have two such cars. What is the probability of at least one of the cars starting on a cold morning?
SELECT THE CORRECT ANSWER
A. 0.84
B. 0.81
C. 0.6
D. 0.36

Correct Option:A
EXPLANATION : This question can be solved by using additive law of probability:(A u B)= P(A)+P(B)-P(A ∩ B)(A u B)= 0.6 + 0.6 - (0.6*0.6) = 1.2 - 0.36 = 0.84 So option a is the correct answer.

Q30. Which is the preferred measure of central tendency for data on Ordinal scale?
SELECT THE CORRECT ANSWER
A. Mean
B. Median
C. Mode
D. None of the above

Correct Option:B
EXPLANATION : On an ordinal scale, one should always use Median as a measure of Central tendency. Option b is the correct answer.

Q31. Which of the tools listed below can and should be used in conjunction with the Project Charter?
SELECT THE CORRECT ANSWER
A. QFD
B. VOC Analysis
C. Pareto Charts
D. RACI Matrix

Correct Option:D
EXPLANATION : RACI Matrix is a roles and responsibilities template and should be used with Project Charter. Answer d is the correct option.

Q32. 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. Correct answer is option b.

Q33. For a process working at 4 Sigma level, how many opportunities per 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:B
EXPLANATION : A 4 Sigma process has a total of 6210 defects, thus option b is correct.

Q34. For incorporating desired attributes into the earliest stages of product design, which technique out of the following is the most effective?
SELECT THE CORRECT ANSWER
A. FTA
B. FRACAS
C. QFD
D. FMEA

Correct Option:C
EXPLANATION:This question requires the knowledge of common reliability techniques (and their acronyms). All the listed techniques, fault tree analysis, failure reporting analysis and corrective action system, quality functional deployment, and failure mode effects analysis are important tools and techniques. However, to develop customer needs and specifications, in the early stages of product design, QFD is the proper technique. Option c is correct.

Q35. 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 : Please 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.

Q36. What does OEE stand 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.

Q37. The process operating conditions are given below. Process Input Quality Parts Re-worked Process A: 100, 80, 5 Process B: 85, 70, 6 Process C: 76, 60, 4 The Rolled Throughput Yield is:

SELECT THE CORRECT ANSWER

A. 52%
B. 50%
C. 60%
D. 70%

Correct Option:A

EXPLANATION : By using standard Rolled Throughput Yield calculations, the answer is 52% .

Q38. All the factors that might contribute to a production problem must be discovered. Which among the following problem-solving tools might be the best choice?

SELECT THE CORRECT ANSWER

A. Pareto diagrams
B. Fishbone diagrams
C. Histograms
D. Control charts

Correct Option:B

EXPLANATION : This question requires basic quality tool knowledge. The Pareto diagram is used to prioritize problems and would not be the initial choice. The histogram and control chart are excellent tools but would not be correct choices for discovering all contributing factors. The fishbone diagram is the best tool for the described application. Answer b is the correct option.

Q39. Machines A & B have been showing disparate efficiency and defects per unit rates despite similar variation in quality at purchase time. If the mean squares between the 2 machines is 250 and the mean square from each machine is 100, what is the value of FSTAT (F-Statistics)?

SELECT THE CORRECT ANSWER

A. 0.4
B. 5
C. 2.5
D. 4
E.

Correct Option:C

EXPLANATION : FSTAT (F-Statistics) = 250/100 = 2.5

Q40. When selecting and scaling the process input variables for a DOE , which of the following is NOT a desirable approach?

SELECT THE CORRECT ANSWER

A. Include as many important factors as possible
B. Set factor levels at practical or possible levels
C. Combine process measurement responses when possible
D. Be bold, but not foolish, in selecting high and low factor levels

Correct Option:C

EXPLANATION : Note that a negative response is requested. Answer choice c is not a good idea. If two or more measurement responses are combined, then the important factor (between them) may remain hidden. The other options (a, b, and d) are valid, prudent actions. Option c is the correct choice.

Q41. When selecting and scaling the process input variables for a DOE , which of the following is NOT a desirable approach?

SELECT THE CORRECT ANSWER

A. Include as many important factors as possible
B. Set factor levels at practical or possible levels
C. Combine process measurement responses when possible

D. Be bold, but not foolish, in selecting high and low factor levels

Correct Option:C
EXPLANATION : Note that a negative response is requested. Answer choice c is not a good idea. If two or more measurement responses are combined, then the important factor (between them) may remain hidden. The other options (a, b, and d) are valid, prudent actions. Option c is the correct choice.

Q42. The least useful measurement scale is:
SELECT THE CORRECT ANSWER
A. Interval
B. Ordinal
C. Nominal
D. Ratio

Correct Option:C
EXPLANATION : Conceptually, the nominal scale gives the least information of all the scales and thus is considered least useful. Option c is the correct answer.

Q43. To simplify the planning and scheduling of large and complex projects, which of the project management tools should be used by the Six Sigma team?
SELECT THE CORRECT ANSWER
A. Work Breakdown Structures
B. Gantt Chart
C. Arrow Diagram
D. PERT

Correct Option:D
EXPLANATION : Though Gantt Chart is typically used as a scheduling tool, usage of PERT is synonymous with scheduling of complex projects. Thus d is the right option.

Q44. The most important statistical objective of conducting Regression Analysis is:
SELECT THE CORRECT ANSWER
A. To show the relationship between two variables
B. To show co-linearity
C. To show per cent variability
D. To represent the relationship with the help of a Best fit line

Correct Option:D
EXPLANATION ; Although you can determine percent variability by use of Regression Analysis and also show the relationship between two variables, determining the best fit line is the most important statistical objective of Regression as it helps you find if the model is a fit or not. Thus, option d is the correct answer.

Q45. In which of the stages does a Team Leader play a supervisory role?
SELECT THE CORRECT ANSWER
A. Forming
B. Storming
C. Norming
D. Performing

Correct Option:D
EXPLANATION : A Team Leader plays a supervisory role in the Performing stage.

Q46. 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.

Q47. An ANOVA is the usual test for experiments including many treatments at different levels. The main reason to use ANOVA for significance testing is:

SELECT THE CORRECT ANSWER

A. Equality of sample means can be tested by comparing sample variances
B. The F test is a measure of the variances
C. Within treatment variation and between treatment variation can be totaled
D. The t test is inadequate for testing beyond two means

Correct Option:A

EXPLANATION : Options c and d are correct statements, but they do not define why ANOVAs are used. Option b is also close, in that all variation is accounted for in the analysis. Option a is a description of ANOVA. So answer a is correct.

Q48. Poka-yoke is best defined as:

SELECT THE CORRECT ANSWER

A. capturing the voice of the customer
B. improving machine efficiency
C. reducing field failures to virtually zero
D. preventing controllable defects

Correct Option:D

EXPLANATION : A poka-yoke device is one that prevents incorrect parts from being made or assembled, or easily identifies a flaw or error.

Q49. In the Define Phase, which of these tools would you use as an immediate precursor to the Project Charter?

SELECT THE CORRECT ANSWER

A. SIPOC Map
B. Pareto Charts
C. VOC Check list
D. QFD

Correct Option:A

EXPLANATION : Although some practitioners prefer using Pareto as the immediate tool prior to Project Charter, the real definition of the project scope comes through only after updating the SIPOC map. Option a is correct.

Q50. In which of the following stages do normally a lot of conflicts arise?

SELECT THE CORRECT ANSWER

A. Forming
B. Storming
C. Norming
D. Performing

Correct Option:B

EXPLANATION : Normally a lot of conflicts arise in the Storming stage.

Q51. A team of six sigma has reached the control stage of DMAIC. They have successfully reduced 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.

Q52. For a data list having outliers, which measure of dispersion works best?

SELECT THE CORRECT ANSWER

A. Variance
B. Mean Deviation
C. Standard Deviation
D. Range

Correct Option:D

EXPLANATION : Variance, mean deviation, and standard deviation all use mean in their calculations. When data has outliers, mean cannot be used. Thus, range is the answer.

Q53. What is more appropriate definition of Non-Value-Add Activity?

SELECT THE CORRECT ANSWER

A. There is no monetary value involved in activity
B. Any activity that does not add any value to the product
C. Non-tangible value
D. The improvements activities cannot be valued by the organization

Correct Option:B

EXPLANATION : It is defined as any activity which clearly creates no value. It can be removed immediately with minimum or no capital investment, and with no detrimental effect on end value.

Q54. Which of the following would be used in determining a process average fraction defective using inductive or inferential statistics?

SELECT THE CORRECT ANSWER

A. Statistics, computed from samples, to make inferences about populations
B. Populations, computed from samples, to make inferences about populations
C. Samples, computed from statistics, to make inferences about populations
D. Samples, computed from populations, to make inferences about samples

Correct Option:A

EXPLANATION : In inferential statistics, one is always making inferences about populations. Thus, option d is eliminated. From the wording of the question, statistics computed from samples is a more logical choice. Option a is correct.

Q55. When using the Poisson as an approximation to the binomial, which of the following conditions apply for the best approximation?

SELECT THE CORRECT ANSWER

A. Larger sample size and larger fraction defective

B. Larger sample size and smaller fraction defective
C. Smaller sample size and larger fraction defective
D. Smaller sample size and smaller fraction defective

Correct Option:B
EXPLANATION : This question requires an understanding of the Poisson and binomial distribution formulas and a review of the answers. The Poisson is an approximation to the binomial distribution when the probability of occurrence is equal to or less than 0.1 and the sample size is large. The smaller the fraction defective and the larger the sample size, the better the approximation. So option b is correct.

Q56. Sum Square of Error is equal to:
SELECT THE CORRECT ANSWER
A. Sum Squares due to Pure Error + Sum Squares due to Lack of Fit
B. Sum Squares due to Pure Error - Sum Squares due to Lack of Fit
C. Sum Squares due to Lack of Fit-Sum Squares due to Pure Error
D. None of the above

Correct Option:A
EXPLANATION : The data analysis is done to confirm the root cause to best achieve values when the SSE calculation can be isolate.

Q57. When compared to a standard, the accuracy level of an instrument can only be:
SELECT THE CORRECT ANSWER
A. Equal to the standard to which it is compared
B. Less than the standard to which it is compared
C. Greater than the standard to which it is compared
D. Less than or equal to the standard to which it is compared

Correct Option:D
EXPLANATION : Option b is incorrect because there is no evidence to support the statement. Options a and c are partially correct. The best and most inclusive choice is answer d.

Q58. What type of waste is "nurse transporting patients to x-ray room"?
SELECT THE CORRECT ANSWER
A. Overproduction
B. Motion
C. Radiation
D. Underutilization

Correct Option:D
EXPLANATION : When people are doing some work that could be done by lower skill people, it would fall into underutilization type of waste. An example would be a nurse transporting patients to x-ray room; this could very well be done by a med tech.

Q59. What should the Six Sigma team infer if the Pearson's Coefficient between a KPOV and KPIV is 0.09?
SELECT THE CORRECT ANSWER
A. No correlation exists
B. The correlation is weak
C. The correlation is very strong
D. The correlation is moderately strong

Correct Option:B
EXPLANATION : Pearson's Rho between 0 to 0.3 indicates weak correlation. Thus, option b is the correct answer.

Q60. On receiving customer comments about their product, what should the Six Sigma team do?
SELECT THE CORRECT ANSWER
A. Analyze the comments
B. Prioritize the comments
C. Arrive at CTQs
D. Understand that the comments are at random

Correct Option:A
EXPLANATION : Customer comments, when received, are always considered raw and therefore analysis should be done on the comments. Option a is correct.

Q61. To find out the overall process efficiency, which of these is considered the best yardstick?
SELECT THE CORRECT ANSWER
A. Yield
B. Throughput Yield
C. Normalized Yield
D. First Pass Yield

Correct Option:D
EXPLANATION : Rolled Throughput Yield is normally considered the best yardstick for measuring overall process efficiency, which is calculated by using First Pass Yield. Option d is correct.

Q62. Which of the following charts have upper control limits, but frequently have lower control limits of zero?
SELECT THE CORRECT ANSWER
A. X-bar and individual charts
B. c charts and u charts
C. p charts and np charts
D. R and sigma charts

Correct Option:D
EXPLANATION : X-bar and individual charts, u charts, p charts, and np charts have lower control limits. In case of some of the attribute charts, the calculated value is negative, which will be shown as zero. R and sigma charts are the charts that have an upper control limit, but may often have a lower control limit of zero. So option d is correct.

Q63. A company wishes to compare the expected mileage of eight different types of car tires. Which one of the following statistical tests is best suited for analysis?
SELECT THE CORRECT ANSWER
A. multiple regression
B. ANOVA
C. paired-difference tests
D. Z-test

Correct Option:B
EXPLANATION : ANOVA is a statistical test that evaluates the difference among means of three or more samples. In this example, each of the eight tires could be tested and its average expected mileage is recorded. ANOVA analysis determines whether at least 2 of the tires have significantly different mileages.

Q64. A company making rubber tires is evaluated on 5 opportunities per product. In 1000 products manufactured in a month if 100 defects are observed, the current sigma levels of the process is:
SELECT THE CORRECT ANSWER

A. 3.5
B. 3.6
C. 4
D. 3.8

Correct Option:B
EXPLANATION : Total Opportunities = 5000 Total Defects = 100 Defects/Opportunities = 100/5000 Defects/Million Opportunities = 100/5000*10,00,000 = 20,000 Sigma levels using table is approximately 3.6.

Q65. Which Matrix diagram illustrates relationships in three planes?
SELECT THE CORRECT ANSWER
A. L type
B. T type
C. X type
D. C type

Correct Option:D
EXPLANATION : The C type Matrix diagram illustrates relationships in three planes. L type, T type, and X type are drawn on two planes.

Q66. The difference between strategic quality goals and the strategic business plan is that:
SELECT THE CORRECT ANSWER
A. Strategic quality goals are often a lower tier than the strategic business plan
B. They are determined only by top management
C. They may offer conflicting priorities
D. They are based on priorities given by all levels of the company

Correct Option:A
EXPLANATION : The key word in this question is "difference." Options b and d are common to both strategic quality goals and the strategic business plan. Option c is incorrect. The strategic business plan forms the higher level with strategic quality goals being a part of it. So answer option a is correct.

Q67. In the theory of control charts, the distribution of the number of defects per unit follows very closely 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.

Q68. Which of the 5S technique requires you to separate necessary and unnecessary items at the workplace?
SELECT THE CORRECT ANSWER
A. Seiri (Sort)
B. Seiso (Shine)
C. Seiton (Stabilize)
D. Non-Value Add

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

Q69. For a process working at 5 Sigma level, how many opportunities 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:A
EXPLANATION : A 5 Sigma process has a total of 233 defects. Thus, option a is correct.

Q70. 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 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 (also known as attribute data). Every item in the sample is evaluated for only the number of defects, flaws, or occurrences, etc.

Q71. What are the two most common determinations of measurement variation that result from a gage R&R study?
SELECT THE CORRECT ANSWER
A. Gage accuracy and precision
B. Gage accuracy and stability
C. Gage linearity and stability
D. Gage reliability and precision

Correct Option:D
EXPLANATION :Sometimes the terms, reliability and precision, are substituted to describe reproducibility and repeatability. R&R stands for reproducibility and repeatability. Answer option d is correct.

Q72. As an experienced experimenter, you have built a predictive model of an experimental data. The difference between the actual response data and the model data are termed as:
SELECT THE CORRECT ANSWER
A. Confounded data
B. Nested experiments
C. Residuals
D. Efficiency of estimators

Correct Option:C
EXPLANATION : The variables could be confounded, but there is no indication that this is the case. The efficiency of estimators and nested experiments are distractor choices. Residuals are the differences between the experimental responses and predicted models. Option c is correct.

Q73. In a typical DFSS Approach, which one of these stages figures in most DFSS approaches?
SELECT THE CORRECT ANSWER
A. Innovate
B. Identify
C. Improve
D. Control

Correct Option:B
EXPLANATION ; IDOV is a popular DFSS approach, in which the stage is Identify, thus b is the correct option.

Q74. For a full factorial experiment with 23 treatments and 1 replicate, how many runs could you expect?
SELECT THE CORRECT ANSWER
A. 8
B. 16
C. 46
D. 32

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

Q75. For a sample size of 36 and a population Standard Deviation of 3, the sample variance for distribution of the means is:
SELECT THE CORRECT ANSWER
A. 0.25
B. 0.5
C. 0.75
D. 1

Correct Option:A
EXPLANATION : Applying CLT principles, Sample Standard Deviation = 3/sqrt(36) = 0.5 and thus sample variance is square of standard deviation. 0.25 is the right answer.

Q76. On a highly automated food processing line, a quality professional wants to chart the weight of packages. The recommended control chart is an X-bar - S chart and not the typical X-bar - R chart, in wide use throughout the facility. Which of the following is the most logical reason for this switch?
SELECT THE CORRECT ANSWER
A. The X-bar control limits will be tighter
B. The supervisor obviously wants some variety in control chart usage
C. Only one control chart will be required
D. The X-bar and S values will come automatically from a weight checker

Correct Option:D
EXPLANATION : This question requires familiarity with X-bar - S charting and automated process equipment. Option C is incorrect. Two charts will still be necessary. Option B is a filler option. Option A may or may not be correct. This answer is dependent upon the sample size. In either event, the plot points and control limits will be proportional (assuming a reasonably small sample size) and is not a logical reason for making the X-bar - S selection. The assumption must be that the supervisor knows that the X-bar - S values can be supplied from an automated weight checker. So option d is correct.

Q77. 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.

Q78. In which of the following stages does the improvement team receive the least control and direction?
SELECT THE CORRECT ANSWER
A. Building
B. Storming
C. Performing
D. Alarming

Correct Option:C
EXPLANATION : The team leader or a facilitator would provide the least control and direction at the performing stage because the team has demonstrated their own effective decision-making capability. The performing stage is the most mature and advanced team stage. So option c is correct.

Q79. Assuming all other conditions to be same and the sample homogeneous, which of the sampling techniques is probable to give the largest sampling error?
SELECT THE CORRECT ANSWER
A. Random sampling
B. Probability sampling
C. Stratified sampling
D. Quota sampling

Correct Option:A
EXPLANATION : a) Random sampling is always considered to be prone to the most sampling errors.

Q80. To optimize the response of a process, ideally what sequence of experimentation should one use?
SELECT THE CORRECT ANSWER
A. Use response surface methodologies at all stages
B. Use screening first and then response surface techniques
C. Use charting techniques first and then ANOVA
D. Use experimental designs first and then ANOVA

Correct Option:B
EXPLANATION : Screening will help the analyst to filter variables and determine what is really important in the response model. Response surfaces will then help optimize the model provided that all variables are quantitative. So option b is correct.

Q81. 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. Option d is correct.

Q82. If P(A) is 0.6, P(B) is 0.5, Probability of both the events happening together is 0.25, what is the probability of either event occurring?

SELECT THE CORRECT ANSWER

A. 0.85
B. 0.8
C. 0.9
D. 0.75

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

Q83. Calculate the standard deviation of the population for the following set of five sample observations: 1.5 , 1.2 , 1.1 , 1.0 , 1.6SELECT THE CORRECT ANSWER

A. 1.28
B. 0.259
C. 0.231
D. 0.518

Correct Option:B
EXPLANATION : The question involves determining the sample standard deviation. The classical method may be used but the use of a statistical calculator is faster and necessary to pass a certification exam. Note the wording of the question. An inference is made about a population. Equation: S must be calculated. The divisor must be n-1. Answer S = 0.2588. So option b is correct.

Q84. Which of the following 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.

Q85. SMED is a lean manufacturing concept that is used to reduce waste in the manufacturing process. What does E stand for?

SELECT THE CORRECT ANSWER

A. exchange
B. error
C. estimate
D. expected

Correct Option:A
EXPLANATION : SMED stands for Single Minute Exchange of Die which means the Die should be exchanged in not more than 9 minutes. So, a is the right answer.

Q86. Normally, what is considered a major fallacy of Hypothesis tests?

SELECT THE CORRECT ANSWER

A. They don't normally give the right results
B. They mislead the practitioners at times
C. The results may be statistically significant in cases, but the practical significance need to be known.

D. They are too biased on errors

Correct Option:C
EXPLANATION : Often, people use Hypothesis tests and arrive at statistically significant results. At times, statistical significance does not imply practical significance, which is the major shortcoming of these tests. Option c is correct.

Q87. Which of the following tools can be used as a prioritization tool?
SELECT THE CORRECT ANSWER
A. Brainstorming
B. Multi-voting
C. NGT
D. Discussions

Correct Option:B
EXPLANATION : Multi-voting can at times be used as a substitute to Pareto charts as a prioritization tool. Option b is the correct answer.

Q88.Which of the following does NOT qualify to be an external customer?
SELECT THE CORRECT ANSWER
A. One who is an end user of the product
B. One who prepares the product
C. One who is an intermediate customer of the product
D. One who is, in some way, affected by the product

Correct Option:B
EXPLANATION : An external customer can never prepare the product and thus option b is correct answer.

Q89. If Cp = 1 and Cpk = 0.7, what should the Six Sigma Green Belt infer:
SELECT THE CORRECT ANSWER
A. Mean has shifted
B. Variations are high
C. Mean has shifted and variations are high
D. Process design needs shifting

Correct Option:A
EXPLANATION : Such a huge change in the values can happen only when the mean shifts from mid-specifications, so a is the right answer.

Q90. What is the best choice in the hands of a Six Sigma team for them to increase the Power of the experiments?
SELECT THE CORRECT ANSWER
A. Reduce Significance level
B. Reduce Sample Size
C. Increase Sample Size
D. All of the above

Correct Option:C
EXPLANATION : Options a and b 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, c is correct.

Q91. For a 2 level, 5 factor experiment, if the number of runs with 1 replicate is 16, which of the following experiments is the Green Belt looking at?
SELECT THE CORRECT ANSWER

A. Full factorial
B. Half fractional factorial
C. Quarter fractional factorial
D. None of the above

Correct Option:C
EXPLANATION : Quarter fractional factorial is an experiment where three quarters of the combinations are omitted.

Q92. A Six Sigma team has understood their Key Output Variable and wish to measure the Key Input Variables affecting the Output variable. They want to use a tool that could present some kind of statistics or data for them. Which of the tools should they use?
SELECT THE CORRECT ANSWER
A. QFD
B. Cause and Effect Diagram
C. Pareto Charts
D. Cause and Effect Matrix

Correct Option:D
EXPLANATION : Pareto Charts could have been a very close option, but both QFD and CE Matrix are applicable. CE Matrix is the right answer because a QFD Matrix is not necessarily used for this purpose.

Q93. 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.

Q94. What should the Six Sigma Green Belt infer if Cp = 1.1 and Cpk = 0.7?
SELECT THE CORRECT ANSWER
A. Variations are high
B. Mean has shifted
C. Mean has shifted and variations are high
D. Process design needs shifting

Correct Option:B
EXPLANATION : Such a huge change in the values can happen only when the mean shifts from mid-specifications. Option b is the correct answer.

Q95. Highly fractional factorial designs are often used as:
SELECT THE CORRECT ANSWER
A. Simplex designs
B. Orthogonal designs
C. Screening experiments
D. Mixture experiments

Correct Option:C
EXPLANATION : In screening experiments, highly fractional factorial designs are used to look for only factor main effects. They are called screening because they try to eliminate seemingly unimportant factors. So option c is correct.

Q96. A Six Sigma Green Belt wants to analyze four factors, at two levels each, one factor at a time. What is the impact on the type I error?

SELECT THE CORRECT ANSWER

A. A type I error improves with each individual analysis
B. Interactions are clearly determined
C. A type I error increases with each individual analysis
D. The optimum combination of factors is revealed

Correct Option:C
EXPLANATION : With each single comparison, more errors are introduced. Even if a proper confidence interval is used for every individual test, the total confidence interval decreases, and consequently the type I error increases. So option c is correct.

Q97. If men having high blood sugar problems are diagnosed with Diabetes, with the mean blood sugar level to be at 150 and a standard deviation of 10, and any individual having greater than 125 Blood Sugar levels can be diagnosed with Diabetes, what is the probability of committing a Type II Error?

SELECT THE CORRECT ANSWER

A. 0.007
B. 0.00655
C. 0.0062
D. 0.0055

Correct Option:C
EXPLANATION : Z = (150-125)/10 = 25/10 = 2.5 Area under 2.5 corresponds to 0.0062. Thus, the probability of a Type II Error, which is beta, is 0.62%. Option c is the correct answer.

Q98. Which of the following techniques is popularly used in Simple Linear Regression to find the best fit model?

SELECT THE CORRECT ANSWER

A. Partial Least Squares
B. Maximum Likelihood Estimate
C. Ordinary Least Squares
D. None of the above

Correct Option:C
EXPLANATION : For a Simple Linear Regression in determining the best fit line, Ordinary Least Squares is the method used. Thus option c is the correct answer.

Q99. If %GRR calculated after doing an MSA Study is 32%, what should the Green Belt do next?

SELECT THE CORRECT ANSWER

A. Accept the gage as valid
B. Check for ndc value
C. Check for Part Variation
D. Check Equipment and Appraiser Variation

Correct Option:D
EXPLANATION : If %GRR value is >30%, the Six Sigma team should check the Equipment and Appraiser Variation to know which one of them to be attacked first. Option d is the correct answer.

Q100. The decision that reliability test results show poor reliability, when in fact the reliability is acceptable is called:

SELECT THE CORRECT ANSWER

A. Good (1-alpha) decision
B. Type II (Beta) error
C. Type I (alpha) error
D. Good (1-Beta) decision

Correct Option:C

EXPLANATION : The rejection of a test result, when the null hypothesis really is true is a type I (alpha) error. Option c is correct.