Lean Six Sigma Black Belt (LSSBB) –

LSSBB Full Length Simulation Test 1

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Q1.Who is typically considered to be a Team Leader in Six Sigma projects?

SELECT THE CORRECT ANSWER

1. Green Belt
2. Champion
3. Black Belt
4. Master Black Belt

**Correct Option:C**

**EXPLANATION : Correct Answer: C) Sometimes, a qualified Green Belt can lead projects, but most of the times the Black Belt is responsible for leading projects.**

Q2.Which one of the factors below is not key to selecting a team member?

SELECT THE CORRECT ANSWER

1. Creativity
2. Willingness
3. Adaptivity
4. None of the above

**Correct Option:D**

**EXPLANATION : Correct answeer: (D) Creativity, Willingness and Adaptivity are all key factors to select a team member, so none of the above is correct**

Q3.If an employee is resistant to change, which one of the below approaches will you not take?

SELECT THE CORRECT ANSWER

1. Empower the change
2. Enforce the change
3. Drop the change
4. Postpone the change

**Correct Option:B**

**EXPLANATION : Correct answer: (B) Enforcing anything will not result in the employee participating in the change effort. In fact, for the time being you may think of achieving the results, but in the long run, such employees may come back to nullify the change efforts.**

Q4.A Black Belt while overcoming change efforts focused 80% of his time trying to deal with resistance issues in his organization. He failed to overcome the resistance still. What might have gone wrong?

SELECT THE CORRECT ANSWER

1. The time to be spent was not planned enough
2. The BB did not get enough leadership support
3. The BB spent time changing the wrong set of people
4. The BB might have used statistical tools in what is a human problem to solve

**Correct Option:C**

**EXPLANATION : Correct answer: C) The rule here is if you have 15% people resistant to change, you should never work on them. Probably the Black Belt would have spent a lot of time working with this 15%, so c is correct.**

Q5.Which of the below mentioned causes could be the main reason for a Black Belt to fail in his role?

SELECT THE CORRECT ANSWER

1. Lack of investment in software and hardware
2. Inability to comprehend statistics
3. Inability to use statistics
4. Lack of leadership support

**Correct Option:D**

**EXPLANATION :Support and commitment for a Lean Six Sigma deployment from the leadership of an organization is one of the key factors for success.**

Q6.What is the main principle of Continual Improvement?

SELECT THE CORRECT ANSWER

1. **Slow and gradual improvement**
2. **Breakthrough improvement**
3. **Goal**
4. **Feedback**

**Correct Option:D**

**EXPLANATION : Correct answer: (D) While principally Continual Improvement is slow and gradual improvement, some approaches also work on the concept of breakthrough improvement, thus d is correct.**

Q7.Which of the below projects moves towards a quick win?

SELECT THE CORRECT ANSWER

1. Lean
2. TRIZ
3. Six Sigma
4. Kaizen Blitz

**Correct Option:D**

**EXPLANATION : Correct answer: (D) Lean, Six Sigma and sometimes TRIZ as well turn out as gradual improvement approaches. Kaizen Blitz is considered a fast approach in terms of how quickly results are achieved. Thus d is correct.**

Q8.The basic benefit of implementing Lean is to

SELECT THE CORRECT ANSWER

1. Improve productivity
2. Improve quality
3. Achieve Continuous Flow in the product
4. Reduce Inventory

**Correct Option:C**

**EXPLANATION:Correct answer: C) The main benefit of implementing Lean is to bring about continuous flow in the product. All other benefits come as a by-benefit.**

Q9.If properly implemented, what can be said with respect to Lean and Stock Turns?

SELECT THE CORRECT ANSWER

1. Lean may reduce stock turns
2. Lean should reduce stock turns
3. Depends on the current and the future state scenario
4. Lean will increase stock turns.

**Correct Option:D**

**EXPLANATION:Correct answer: (D) Increasing stock turns is the only possible benefit so d is correct.**

Q10.If the scrap levels have reduced from 30% to 25%, what is your assessment of the Lean status of the project?

SELECT THE CORRECT ANSWER

1. Objectives met
2. Not met
3. Need to study the business aspects
4. None of the above

**Correct Option:C**

**EXPLANATION:Correct answer: C) Although a reduction in scrap levels has been accomplished, any decision on whether the process is Lean or not can only be taken after the financial impacts have been studied. 30% to 25% may still signify some kind of waste lurking around, but that doesn't mean it is a failure, so c is correct.**

Q11.What of these does Warusa Kagen help in identifying?

SELECT THE CORRECT ANSWER

1. Transportation
2. Inventory
3. Motion
4. Muda

**Correct Option:D**

**EXPLANATION:Correct answer: (D) Muda**

Q12.If the customer demand for a product is 100 products, total time is 480 minutes out of which 30 minutes lost to setup and 60 minutes for meetings, what is the TAKT Time?

SELECT THE CORRECT ANSWER

1. 3.9 minutes per product
2. 3.6 minutes per product
3. 4.2 minutes per product
4. 5.9 minutes per product
5. 4.8 minutes per product

**Correct Option:A**

**EXPLANATION:Correct answer: (A) By applying standard TAKT Time formula**

Q13.If TAKT Time is 4 minutes and Cycle time is 4.5 minutes, what is the possible repercussion if operating conditions are unchanged?

SELECT THE CORRECT ANSWER

1. Production is levelled
2. Demand is levelled
3. Customer receives his orders on time
4. Customer will have to wait

**Correct Option:D**

**EXPLANATION:Correct answer: (D) If Cycle time is greater than TAKT Time, less number of products would be produced in the delivery time, resulting in the customers to wait, thus d is correct.**

Q14.In order to reduce lead time, which of the below times should not be focused on

SELECT THE CORRECT ANSWER

1. Throughput time
2. Cycle Time
3. Lead Time
4. Wait time

**Correct Option:C**

**EXPLANATION:Correct answer: C) Reduction of throughput time, cycle time and wait time will all result in reducing lead time, thus c is correct incorrect choice.**

Q15.If Actual Setup time is 100 minutes and Total Available setup time provided by the model is 200 minutes and you have a total of 10 machines, what is the EPEI?

SELECT THE CORRECT ANSWER

1. 5 days
2. 10 days
3. 20 days
4. Data not enough

**Correct Option:A**

**EXPLANATION:Correct answer: C) EPEI = 100 mins/200 mins = 0.5. 10 machines will have to be changed over, thus the EPEI is 5 days.**

Q16.Which time would you focus to reduce to reduce batch size

SELECT THE CORRECT ANSWER

1. Lead time
2. TAKT Time
3. Cycle Time
4. Wait time

**Correct Option:C**

**EXPLANATION:Correct answer: C) Reducing Cycle time is the best method to reduce batch size, thus c is the correct option.**

Q17.Which Lean tool would you use to identify problems proactively from the shop floor?

SELECT THE CORRECT ANSWER

1. Kobetsu Kaizen
2. VSM
3. Gemba
4. Genchi Genbutsu

**Correct Option:D**

**EXPLANATION:Correct answer: (D) Gemba walks are referred to as going to the shop floor, but Genchi Genbutsu is the tool that is used to identify problem proactively from the floor.**

Q18.Which tool loosely translates to Management by Wandering?

SELECT THE CORRECT ANSWER

1. Hoshin Kanri
2. Enryo
3. Genchi Genbutsu
4. Kaizen

**Correct Option:C**

**EXPLANATION:Correct answer: C) Hoshin Kanri is a planning tool. Kaizen is a sustained CI event while Enryo is a philosophy. Thus c is correct.**

Q19.Batch size impacts:

SELECT THE CORRECT ANSWER

1. Strategies
2. prices
3. inventory
4. cycle time

**Correct Option:C**

**EXPLANATION:Correct answer: C) One of the significant impacts of Batch Size is inventory, so c is correct.**

Q20.The Six Sigma team wishes to understand how well its product is doing in terms of its customer needs. Which tool would it use?

SELECT THE CORRECT ANSWER

1. VOC
2. Cause Effect Matrix
3. QFD
4. None of the above

**Correct Option:C**

**EXPLANATION:Correct answer: C) QFD is the best tool to use here although one may want to use CE Matrix, QFD is preferred because of its robustness.**

Q21.A team wishes to benchmark some of its functions with the best practices existent in the organization. Which type of benchmarking would it need to do?

SELECT THE CORRECT ANSWER

1. Internal
2. External
3. Functional
4. Competitive

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Internal benchmarking accomplishes the objective discussed in the question and thus, a is correct.**

Q22Which of the below is not studied as part of MSA?

SELECT THE CORRECT ANSWER

1. Accuracy
2. Repeatability
3. Bias
4. Linearity

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Accuracy of a measurement system is an assumed metric and thus a is correct.**

Q23.A Black Belt collects customer comments with the help of survey groups. Which tool must he use next with the customer requirements?

SELECT THE CORRECT ANSWER

1. Tree Diagram
2. Brainstorming
3. QFD
4. Affinity Diagram

**Correct Option:D**

**EXPLANATION:Correct answer: (D) An affinity diagram helps the team to categorize the comments in groups, which is important. Post using the Affinity diagram, the Black Belt can use QFD, but to answer this question d is correct.**

Q24.The tool used for selecting an appropriate concept is known as

SELECT THE CORRECT ANSWER

1. Pugh Matrix
2. Design of Experiments
3. Function Deployment Matrix
4. Brainstorming
5. Project Prioritization Matrix

**Correct Option:A**

**EXPLANATION : Correct answer: (A) Pugh Matrix is the universal tool known for this purpose so a is correct.**

Q25.Which one of these is not a basic need to be fulfilled to answer if it could be a possible SS project?

SELECT THE CORRECT ANSWER

1. Process
2. Problem
3. Financial benefits
4. The degree of the problem

**Correct Option:D**

**EXPLANATION : Correct answer: (D) Degree of the problem is not a pre-requisite so d is correct.**

Q26.The minimum expected annual cost savings for an Enterprise wide BB project

SELECT THE CORRECT ANSWER

1. $200,000 annually
2. $150,000 – 175,000
3. $50,000 - $75,000
4. $100,000 - $125,000

**Correct Option:A**

**EXPLANATION : Correct answer: (A) Though financial savings depend entirely project-project, at the end of the day you would find that a Black Belt project should save at least $200,000 thus a is correct.**

Q27.Which one of the below mentioned tools would a Champion least likely to ask in a Define Tollgate?

SELECT THE CORRECT ANSWER

1. Pareto of why variations occurred
2. Pareto on customer complaints
3. SIPOC Map
4. Charter

**Correct Option:A**

**EXPLANATION : Correct answer: (A) Although a Pareto can be drawn in the Define Phase, Pareto of why variations occurred can be best left to the Analyse Stage, thus a is correct.**

Q28.A Black Belt collects 20 VOC comments and he finds that the comments are categorized amongst just 2 groups. He wants to use a Pareto to prioritize. Before doing so, what should he do?

SELECT THE CORRECT ANSWER

1. Group the comments
2. Verify the validity of the comments
3. Collect some more comments as 2 groups is too few for a Pareto
4. Irrespective, should plot a Pareto

**Correct Option:B**

**EXPLANATION : Correct answer: (B) Now this is a bit confusing. Except for option d which is not a serious consideration, the Black Belt may decide to do either a b or c. Most Black Belts though would know that customer comments once received need to be verified first, thus b is correct.**

Q29.In drawing a SIPOC map, which one of the blocks should be drawn first?

SELECT THE CORRECT ANSWER

1. Supplier
2. Customer
3. Input
4. Process

**Correct Option:D**

**EXPLANATION : Correct answer: (D) A SIPOC map always commences by drawing the Process Block first.**

Q30.Which of the below measurement scales reveal the least information about the data you would be working with?

SELECT THE CORRECT ANSWER

1. Nominal
2. Ordinal
3. Interval
4. Ratio

**Correct Option:A**

**EXPLANATION:Correct answer: (A) The Nominal Scale is always considered least informative thus a is correct.**

Q31.Rank order correlation is typically used with data on which of these measurement scales

SELECT THE CORRECT ANSWER

1. Nominal
2. Interval
3. Ordinal
4. Ratio

**Correct Option:C**

**EXPLANATION:Correct answer: C) ROC is used only with the ordinal scale thus c is correct.**

Q32.Should the data have unforeseen outliers, whose behaviour you cannot explain during the Measure phase, which of the methods of Dispersion should you use?

SELECT THE CORRECT ANSWER

1. Inter-quartile range
2. Standard Deviation
3. Variance
4. Range

**Correct Option:D**

**EXPLANATION : Correct answer: (D) Range is considered the best measure of dispersion if the data has outliers**

Q33.A Measurement System Analysis study is done to conduct an assessment of two major Measurement system issues. What are the two major issues?

SELECT THE CORRECT ANSWER

1. Reliability and Precision
2. Repeatability and Reproducibility
3. Noise and Signal
4. Stability and Resolution

**Correct Option:A**

**EXPLANATION : Correct answer: (A) MSA is always used to study two major topics - Reliability and Precision and thus a is correct.**

Q34.For a Measurement system to be considered acceptable, which one of the below mentioned properties need to be taken care of, first?

SELECT THE CORRECT ANSWER

1. Stability
2. Bias
3. Resolution
4. Precision

**Correct Option:C**

**EXPLANATION:Correct answer: C) Resolution is always the first thing to be taken care of in an MSA study, thus c is correct.**

Q35.Which one of the below tools you can NOT use to define a process?

SELECT THE CORRECT ANSWER

1. Value Stream Map
2. Process Map
3. Affinity Diagram
4. SIPOC

**Correct Option:C**

**EXPLANATION:Correct answer: C) Affinity diagram is the least useful of all the tools, as it helps you to group ideas. Thus c is correct.**

Q36.Change in the actual value with respect to Reference value refer to which characteristic of a Measurement system

SELECT THE CORRECT ANSWER

1. Stability
2. Bias
3. Linearity
4. Repeatability

**Correct Option:B**

**EXPLANATION: Correct answer: (B) Bias fits the question best, so b is correct.**

Q37.Which of the chart would you normally use to understand if the Measurement system is stable?

SELECT THE CORRECT ANSWER

1. Xbar - S
2. I-MR
3. EWMA chart
4. Xbar - R

**Correct Option:D**

**EXPLANATION : Correct answer: (D) Xbar - R is the popular chart used here thus d is correct.**

Q38.If an Xbar - R chart for a MS Analysis shows in Control, what should a Black Belt deduce importantly?

SELECT THE CORRECT ANSWER

1. Measurement system is stable
2. Measurement system is linear
3. Measurement system has adequate discrimination
4. Measurement system is repeatable

**Correct Option:C**

**EXPLANATION : Correct answer: C) A chart showing in Control means the measurement system is stable. This is fair to say, but very specific to a Measurement System this also shows the MS has adequate Discrimination or Resolution, so c is correct.**

Q39.To understand part variation, which of these should be taken care of importantly?

SELECT THE CORRECT ANSWER

1. Repeatability
2. Reproducibility
3. Gage Variation
4. Resolution
5. Accuracy

**Correct Option:C**

**EXPLANATION:Correct answer: C) Process variation or part variation can only be understood if Gage variation is handled, thus c is correct.**

Q40.Discrimination is closely connected to or referred to by which other metric

SELECT THE CORRECT ANSWER

1. Resolution
2. Accuracy
3. Linearity
4. Bias

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Resolution is the other name for Discrimination thus a is correct.**

Q41.For Attribute Data, what is the typical flow of events with respect to the two activities, Baselining and Measurement system analysis?

SELECT THE CORRECT ANSWER

1. Baseline then do MSA
2. MSA then do Baseline
3. Baseline then do MSA then do re-MSA
4. No specific flow as such and depends on the decision of the Black Belt

**Correct Option:C**

**EXPLANATION:Correct answer: C) Baselining should always be done twice - Once before MSA and once after MSA. This also shows improvement done by fixing Measurement System Variation.**

Q42.Per CLT conditions if the sample size is 33 and the Sample mean of averages found is 4, what is the population mean?

SELECT THE CORRECT ANSWER

1. 4
2. 4/Square root(33)
3. Cannot determine
4. 2

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Sample mean = Population mean by CLT thus a is correct.**

Q43.Process conditions are given below: USL = 32, LSL = 29, Target = 30.5, Process Mean = 31.8. A Black Belt's comment on such a process after all investigating all pre conditions is

SELECT THE CORRECT ANSWER

1. The process is stable
2. The process seems to be capable on specification
3. The process is capable on target
4. The process could be unstable, and the degree of confidence on future stability is low

**Correct Option:D**

**EXPLANATION:Correct answer: (D) The process mean within the USL states process stability although Control limits may still be less, it could be fair in saying the process could be unstable, and the degree of confidence on future stability is low.**

Q44.A normality test done by a Black Belt reveals that the p-value is 0.049. The significance level assumed for testing is 0.05. What should the Black Belt infer?

SELECT THE CORRECT ANSWER

1. The data is normal bar one or two exceptions
2. The data may not follow a normal distribution
3. The Box Cox transformation should be used to check the fit
4. The data may have to be subjected to further tests.

**Correct Option:B**

**EXPLANATION:Correct answer: (B) By following standard rejection conditions.**

Q45.A normality test on distribution identifications reveals the below findings in a summary. These only have significant findings. What should the Black Belt do? Distribution p-value Normal 0.024 3-Parameter Weibull 0.080 Log-normal 0.052 Box Cox 0.460

SELECT THE CORRECT ANSWER

1. Choose normal after transforming data
2. Choose 3-Parameter Weibull
3. Choose Log-Normal
4. Can't decide

**Correct Option:A**

**EXPLANATION:Correct answer: (A) The Box Cox distribution has the best fit value here. So, the Black Belt should transform the data and thus a is correct.**

Q46.For a process having spec limits at ±3?, Cp is

SELECT THE CORRECT ANSWER

1. 0.5
2. 1
3. 1.5
4. 2

**Correct Option:B**

**EXPLANATION:Correct answer: (B) By applying standard Cp formula.**

Q47.If Cp = 0.8. Cpk = 0.7, what should the Black Belt do first?

SELECT THE CORRECT ANSWER

1. Reduce variations
2. Center the mean
3. Bring the process in statistical control
4. The choice of what to do rests with the Black Belt

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Cp value less than 1 automatically indicates that variations are high in the process thus a is correct.**

Q48.For a capability study conducted on normal data, the reported set of values are Cpk = 1.2 and Ppk = 1.4. What could be the Black Belt's inference? i. The process is in control ii. The process may not have been in control iii. The process may not have been normal

SELECT THE CORRECT ANSWER

1. i and ii
2. ii and iii
3. i, ii and iii

**Correct Option:B**

**EXPLANATION:Correct answer: (B) Such a condition can only happen when option b holds, i.e. process is not in control and process not normal.**

Q49.A process produces rubber tires on a continuous basis. Past process performance indicates 2% chance of the bottles having one or more flaws. If we draw a sample of 20 units from the lot, what is the probability we will have 0 defectives?

SELECT THE CORRECT ANSWER

1. 0.66
2. 0.62
3. 0.6
4. 0.5

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Applying standard binomial formula with p = 0.02 and x = 0.**

Q50.For a conservatively large sample size and p >0.5, the Binomial Distribution approximates

SELECT THE CORRECT ANSWER

1. Normal Distribution
2. Poisson Distribution
3. Hypergeometric Distribution
4. Chi-Square Distribution

**Correct Option:A**

**EXPLANATION:Correct answer: (A) For large sample sizes, the Binomial distribution moves to the normal distribution and hence a is correct.**

Q51.If a Black Belt wishes to visually inspect the causes resulting in an end problem, which one of the tools should he use?

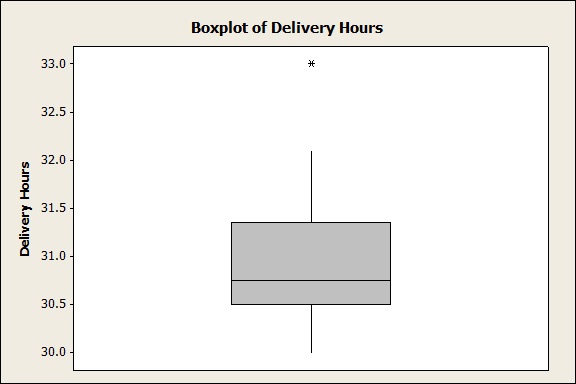
SELECT THE CORRECT ANSWER

1. Brainstorming
2. Affinity Diagram
3. Cause and Effect Diagram
4. Cause and Effect Matrix

**Correct Option:C**

**EXPLANATION:Correct answer: C) The CE Diagram is the best possible tool here so c is correct.**

Q52.A Box Plot is shown below. What should a Black Belt merely by looking at the Box Plot? Choose the most appropriate option.



SELECT THE CORRECT ANSWER

1. The Upper Whisker is at 33.0
2. The Data could be skewed
3. The data forms a normal distribution
4. The Lower Whisker is at 30

**Correct Option:B**

**EXPLANATION:Correct answer: (B) Option a and d are visible from the Box Plot, but in terms of comprehending, this plot tells you that the data is skewed.**

Q53.A Regression model is setup to understand the impact of factors A, B and C on the output Y. Post the model is tested, it is found that A and B correlate to each other. They are considered

SELECT THE CORRECT ANSWER

1. Correlated
2. Auto-correlated
3. Collinear
4. Confounded

**Correct Option:C**

**EXPLANATION:Correct answer: C) Collinear means correlated to each other unless they auto-correlate, so c is correct.**

Q54.Which of the below mentioned values can be used in a Regression model to understand the Output Variables' performance for a new set of observations in the input variable?

SELECT THE CORRECT ANSWER

1. Mallows Cp
2. Adjusted R2
3. R2
4. Predicted R2

**Correct Option:D**

**EXPLANATION:Correct answer: (D) The other three are not serious considerations.**

Q55.If VIF value from a Regression model is 10.2, what should the Black Belt do next?

SELECT THE CORRECT ANSWER

1. Separate the variables and conduct a Simple Linear Regression
2. Drop the predictor that is causing the high VIF and then re-do Regression
3. Live with the variable having high VIF and hope that it is a model adequacy issue
4. Try doing a Curvilinear Regression

**Correct Option:B**

**EXPLANATION:Correct answer: (B) The VIF model being so high, the Black Belt should drop the predictor that is causing the high VIF and then re-do Regression thus b is correct.**

Q56.The Sum Squares of Errors metric explains which of the following

SELECT THE CORRECT ANSWER

1. Model Adequacy
2. Lack of fit
3. Residuals
4. Quality of fit

**Correct Option:D**

**EXPLANATION:Correct answer: (D) Sum Squares always explains quality of fit thus d is correct.**

Q57.A company surveyed a society to find out the percentage of people who consumed burgers regularly. It went into the survey with a confidence of 95%. The margin of error considered was ±1%. About 25% of 1000 people polled Yes in a society of 10,000 people. What is the range of people in the population who would have voted Yes?

SELECT THE CORRECT ANSWER

1. 20% - 30%
2. 22% - 28%
3. 24% - 26%
4. 21% - 29%

**Correct Option:C**

**EXPLANATION:Correct answer: C) Applying standard confidence intervals formula for proportions.**

Q58.An experimenter wishes to have his confidence intervals width in a tight band, i.e. he doesn't wish to have a broad range. What should he do?

SELECT THE CORRECT ANSWER

1. Increase the confidence level
2. Increase the sampling size
3. Increase the significance level
4. Increase the Power

**Correct Option:B**

**EXPLANATION:Correct answer: (B) The Margin of Error can be reduced by increasing the sampling size, although significance level also plays an important part but b is the best possible answer.**

Q59.For a data meeting normality conditions, which of the tests mentioned below would you use to test if the data comes from the population assuming sample size is 35 and if you wish to test means?

SELECT THE CORRECT ANSWER

1. Z test
2. T test
3. f test
4. ANOVA

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Z test needs to be used specifically if n > 35, thus a is correct.**

Q60.Six Sigma projects in which niche place extra importance of Type II error rather than Type I error

SELECT THE CORRECT ANSWER

1. Sales
2. Medicine
3. Robotics
4. Marketing

**Correct Option:B**

**EXPLANATION:Correct answer: (B) In Clinical applications, Type II error is considered more serious thus b is correct.**

Q61.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 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

1. 0.062
2. 0.62
3. 0.0062
4. Practically 0%

**Correct Option:C**

**EXPLANATION:Correct answer: C) Using the standard normal distribution formula, z = (x-xbar)/sigma.**

Q62.For a proportion percentage of 30% and at a confidence level of 95%, the sample size for a margin of error 5% is

SELECT THE CORRECT ANSWER

1. 325
2. 350
3. 30 as per CLT
4. 100

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Using the standard formula for sample size or sample size calculator.**

Q63.Which distribution is typically used in calculating the test statistic in a Kruskal Wallis test?

SELECT THE CORRECT ANSWER

1. Z distribution
2. F distribution
3. Chi-Square distribution
4. None of the above

**Correct Option:C**

**EXPLANATION:Correct answer: C) Kruskal wallis test uses the Chi-Square distribution in calculating test statistic, so c is correct.**

Q64.When the estimate of an effect also includes the influence of one or more other effects (usually high order interactions) the effects are said to be

SELECT THE CORRECT ANSWER

1. Aliased
2. Mixed
3. Fixed
4. Interacted

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Aliasing happens when influence of one or more effects get mixed, so a is correct.**

Q65.By restricting randomization, what do you achieve?

SELECT THE CORRECT ANSWER

1. Repeatable observations
2. Reproducible observations
3. Blocking
4. None of the above

**Correct Option:C**

**EXPLANATION:Correct answer: C) Blocking is logically correct.**

Q66.To estimate curvature in a design, which one of the techniques would you prefer to use in a design?

SELECT THE CORRECT ANSWER

1. Add replicates
2. Add blocks
3. Randomize the runs
4. Add center points or axial points

**Correct Option:D**

**EXPLANATION:Correct answer: (D) Adding center points is the best way to estimate curvature in a design.**

Q67.If Temperature is a factor at a high level of 65 degree Celsius and a low level of 55 degree Celsius, what should be the coded value of the centre point assuming design is represented in a geometric scale?

SELECT THE CORRECT ANSWER

1. -1
2. 1
3. 60
4. 0

**Correct Option:D**

**EXPLANATION:Correct answer: (D) The coded value assuming a two level design is -1 and 1 and center point is 0, so d is correct.**

Q68.Which of the following is NOT true for Design of Experiments setups?

SELECT THE CORRECT ANSWER

1. The setup should focus on controllable factors
2. The setup should ignore uncontrollable factors
3. The setup should focus on uncontrollable factors
4. Equal weightage needs to be given for controllable as well as uncontrollable factors

**Correct Option:C**

**EXPLANATION:Correct answer: C) A designed setup never focuses extensively on uncontrollable factors so c is correct.**

Q69.If the effects of any factor balances out across the effects of other factors in a design, the design is said to be

SELECT THE CORRECT ANSWER

1. Balanced
2. Orthogonal
3. Nested
4. Crossed

**Correct Option:B**

**EXPLANATION:Correct answer: (B) Balancing of effects results in orthogonality so b is correct.**

Q70.A Black Belt conducts a designed experimental setup on his factors. While conducting the experiment, he finds that some main effects are aliased with 2nd order and 3rd order interaction. Which type of experiment did he conduct?

SELECT THE CORRECT ANSWER

1. Screening experiment
2. Fractional Factorial Design
3. Full Factorial Design
4. Resolution experiments
5. Response Surface Designs

**Correct Option:D**

**EXPLANATION:Correct answer: (D) Such settings are popular only with Resolution experiments so d is correct.**

Q71.If Factor A affecting response scores at one level are 60,60,61 and 62 and factor A affecting response scores at level two are 60,58,59,60, the main effect is

SELECT THE CORRECT ANSWER

1. 0.5
2. 1
3. 1.5
4. 2

**Correct Option:C**

**EXPLANATION:Correct answer: C) Using the convention formula for arriving at main effects, c is correct.**

Q72.If the Sum of Squares of treatments is 100, the group size is 25 and number of treatments is five, the Mean Squares of treatments is

SELECT THE CORRECT ANSWER

1. 20
2. 5
3. 25
4. 15

**Correct Option:C**

**EXPLANATION:Correct answer: C) Mean Squares of treatments is sum squares of treatments/number of treatments -1, thus c is correct.**

Q73.For a 23 design with 2 replicates, how many runs can you expect with a quarter fractional factorial experiment?

SELECT THE CORRECT ANSWER

1. 8
2. 16
3. 12
4. None of the above

**Correct Option:D**

**EXPLANATION:Correcr answer: (D) For a 3 factor 2 level experiment, 1/4th fractional factorial design can be made, so d is correct.**

Q74.Which one of these techniques is accomplished by default with the help of special computer packages in doing DOE?

SELECT THE CORRECT ANSWER

1. Replication
2. Randomization
3. Blocking
4. None of the above

**Correct Option:B**

**EXPLANATION:Correct answer: (B) Randomization always happens by default with special computer packages so b is correct.**

Q75.For a 4 factor 2 level Half fractional factorial design, which of the following statements are true? i. Third order interactions are aliased ii. Second order interactions are aliased iii. The fourth order term could be the Design Generator iv. All main effects are significant

SELECT THE CORRECT ANSWER

1. i and ii
2. i, ii and iii
3. i and iii
4. i, ii, iii and iv

**Correct Option:C**

**EXPLANATION:Correct answer: C) The settings for the experimental design hold good only with third order interactions being aliased and fourth order term being the design generator, so c is correct.**

Q76.Which of these is true for the Taguchi's L8 Design?

SELECT THE CORRECT ANSWER

1. Interactions are tested, but the results are available for main effects only
2. Interactions get aliased with main effects
3. All main effects are considered significant
4. All interactions are considered insignificant

**Correct Option:A**

**EXPLANATION:Correct answer: (A) In Taguchi's L8 Design, Interactions are tested, but the results are available for main effects only, so a is correct.**

Q77.Which of these is a mathematical process for separating the variability of a group of observations into assignable causes?

SELECT THE CORRECT ANSWER

1. DOE
2. ANOVA
3. Homogeneity of Variances
4. Setting up Control Limits

**Correct Option:B**

**EXPLANATION:Correct answer: (B) ANOVA always separates variability of a group of observations into assignable causes thus b is correct.**

Q78.A design where all the cells have the same number of observations is known as a

SELECT THE CORRECT ANSWER

1. Full factorial design
2. Nested Design
3. Crossed Design
4. Balanced Design

**Correct Option:D**

**EXPLANATION:Correct answer: (D) A Balanced Design always has the same number of observations thus d is correct.**

Q79.A Black Belt when conducting Designed Experiments, transforms the scale of measurement of a factor to -1 and +1. What did he do just now?

SELECT THE CORRECT ANSWER

1. Introduced a Dummy Variable
2. Introduced a Center Point
3. Coded the Factors
4. Set levels for the factors

**Correct Option:C**

**EXPLANATION:Correct answer: C) When scales are changed to -1 and +1, coding happens and thus c is the correct answer.**

Q80.Which of these techniques help you to nullify the effect of nuisance factors?

SELECT THE CORRECT ANSWER

1. Blocking
2. Randomization
3. Replication
4. Coding

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Blocking helps you to eliminate variation due to extraneous factors thus a is correct.**

Q81.Which of these charts help answering the question, 'Has special cause of variation resulted in central tendency to move or shift over a period of time?'

SELECT THE CORRECT ANSWER

1. Range Chart
2. Averages Chart
3. Sigma Chart
4. EWMA Chart

**Correct Option:B**

**EXPLANATION:Correct answer: (B) Averages chart show movement of central tendency thus b is correct.**

Q82.Which of these charts help answering the question, ‘Have any small process shifts resulted in the process to exhibit unusual patterns in dispersion?’

SELECT THE CORRECT ANSWER

1. Range Chart
2. Average Chart
3. Sigma Chart
4. EWMA Chart

**Correct Option:D**

**EXPLANATION:Correct answer: (D) EWMA charts are popularly used for detecting small process shifts, so d is correct.**

Q83.What is true about rational subgroups?

SELECT THE CORRECT ANSWER

1. They are taken from a homogeneous sample
2. They always represent the same readings
3. They are produced essentially under the same conditions
4. They give a good outline of how variations are, in the process

**Correct Option:C**

**EXPLANATION:Correct answer: C) Rational subgroups are always produced under the same conditions so c is correct.**

Q84.Which of these control charts for variables is sensitive to non-normality of the data?

SELECT THE CORRECT ANSWER

1. Xbar - R
2. Xbar - S
3. EWMA
4. I-MR

**Correct Option:D**

**EXPLANATION:Correct answer: (D) Of all these charts, I-MR is considered most sensitive to non-normality of data, thus d is correct.**

Q85.The mean of Ranges of a process sample collected across 20 samples is 6, and the mean of averages is 10 with the sample size of 8 per sample. The Control limits for the Averages charts are

SELECT THE CORRECT ANSWER

1. 6,14
2. 7, 13
3. 7.76, 12.24
4. 8.1, 11.9

**Correct Option:C**

**EXPLANATION:Correct answer: C) Using Control Chart constants, c is correct.**

Q86.For sum of sub group ranges to be at 369 and the number of subgroups is 25 with each subgroup having 5 samples, the control limits for the Range Chart are

SELECT THE CORRECT ANSWER

1. 0, 25
2. 0, 31
3. 11, 25
4. 11, 31

**Correct Option:B**

**EXPLANATION:Correct answer: (B) Using Control Chart constants, b is correct.**

Q87.For sum of sub group averages at 2487, number of subgroups is 25 and each subgroup having 5 samples, the control limits for the Averages chart are

SELECT THE CORRECT ANSWER

1. 91, 108
2. 81, 121
3. 0, 100
4. 70, 131

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Using Control Chart constants, a is correct.**

Q88.In a sigma chart, what is the precise reason for calculating Sigma separately for each subgroup rather than calculating grand average for sigma?

SELECT THE CORRECT ANSWER

1. Sub group statistics are important to be represented
2. Sub group sigma is generally more accurate
3. Sub group sigma doesn’t introduce unnecessary special cause
4. Range is considered better than Sigma

**Correct Option:C**

**EXPLANATION:Correct answer: C) The primary for reason for doing what is specified in the question is because subgroup sigmas present the actual picture and doesn't show unnecessary special causes, so c is correct.**

Q89.Which of these control charts is known to have varying Control limits all the time?

SELECT THE CORRECT ANSWER

1. Xbar R
2. Xbar S
3. P chart
4. EWMA Chart

**Correct Option:D**

**EXPLANATION:Correct answer: (D) Control limits in an EWMA chart vary on the lines of an exponential distribution, so d is correct.**

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**Correct Option:D**

**EXPLANATION:Correct answer: (D) Control limits in an EWMA chart vary on the lines of an exponential distribution, so d is correct.**

Q90.Assuming all other conditions for plotting control charts to be valid, which condition holds TRUE for plotting I-MR Charts?

SELECT THE CORRECT ANSWER

1. When you can collect only one observation per day
2. When it is not feasible to use averages chart for process control
3. When within-subgroup variation is to small relative to batch-batch variation
4. All of the above

**Correct Option:D**

**EXPLANATION:Correct answer: (D) All the above conditions mentioned from a to c hold good for I-MR Charts.**

Q91.What is the major benefit of using Xbar charts over Individuals charts?

SELECT THE CORRECT ANSWER

1. The Average charts are not sensitive to non-normality
2. The Average charts provide tighter controls
3. Average charts best indicate within and between subgroup variation
4. Average charts show mean shift

**Correct Option:B**

**EXPLANATION:Correct answer: (B) Xbar charts have tighter controls than the I-MR Charts, although a c and d are also right, but b is considered the major benefit.**

Q92The main reason of preferring an Individuals over an Averages charts is

SELECT THE CORRECT ANSWER

1. Need to collect lesser samples
2. Process shifts detected easily
3. Additional sensitivity by averages charts not justified
4. Process drifts detected easily

**Correct Option:A**

**EXPLANATION:Correct answer: A)Plots individual observations (I chart) and moving ranges (MR chart) over time for variables data. Use this combination chart to monitor process center and variation when it is difficult or impossible to group measurements into subgroups. This occurs when measurements are expensive, production volume is low, or products have a long cycle time., so (A) is correct.**

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Q93.Which of these charts would you normally use to plot the performance of proportion defectives?

SELECT THE CORRECT ANSWER

1. p chart
2. np chart
3. u chart
4. c chart

**Correct Option:A**

**EXPLANATION:Correct answer: (A) A p chart is always plotted for proportion of defectives, so a is correct.**

Q94.Which of these charts would you normally use to plot the performance of count of defectives?

SELECT THE CORRECT ANSWER

1. p chart
2. np chart
3. u chart
4. c chart

**Correct Option:B**

**EXPLANATION:Correct answer: (B) For count of defectives, np chart is used so b is correct.**

Q95.The total number of products inspected is 250 per batch. The probability of having defectives in this batch is 0.193. The Control Limits are

SELECT THE CORRECT ANSWER

1. 0.12, 0.27
2. 0.15, 0.30
3. 0.20, 0.40
4. 0.22, 0.44

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Using p chart calculations**

Q96.The number of defective items counted in a batch of 250 is on an average found to be 28. The Control Limits are

SELECT THE CORRECT ANSWER

1. 13, 45
2. 10, 40
3. 9, 36
4. 11, 44

**Correct Option:A**

**EXPLANATION:Correct answer: (A) Using np chart calculations, a is correct.**

Q97.For a non-normal data having a sub-group size of 1, which of the following charts would you prefer to use for purposes of Control charting

SELECT THE CORRECT ANSWER

1. X chart
2. Z chart
3. Run chart
4. MR Chart

**Correct Option:C**

**EXPLANATION:Correct answer: C) In the condition specified in the question, a Run chart is popularly used.**

Q98.What is absolutely TRUE all the time about a Process in Control?

SELECT THE CORRECT ANSWER

1. The process will always be between the Control Limits
2. The variation in such a process will be less
3. The process will exhibit only random variation
4. Variability of such a process is less

**Correct Option:C**

**EXPLANATION:Correct answer: C) When a process is in control, it will only exhibit random variation, so c is correct although options a, b and d hold good circumstantially, but c is the correct option.**

Q99.What is the main cause of discrete patterns appearing in a Control Chart?

SELECT THE CORRECT ANSWER

1. Inaccurate Data
2. Inaccurate charting technique
3. Inadequate Resolution of the Gage
4. Erroneous measurements

**Correct Option:C**

**EXPLANATION:Correct answer: C) Inadequate resolution of the gage will result in the same numbers repeating time and again, thus c is the correct option.**

Q100.Which of the charts below has Control limits following an Exponential function?

SELECT THE CORRECT ANSWER

1. Levey Jennings Chart
2. Hotelling T2 Chart
3. EWMA Chart
4. CUSUM Chart

**Correct Option:C**

**EXPLANATION:Correct answer: C) Only for an EWMA Chart the Control limits follow an exponential distribution so c is correct.**