Number: ICBB
Passing Score: 800
Time Limit: 120 min
File Version: 14.1

Six Sigma ICBB

Exam Name: IASSC Lean Six Sigma – Black Belt

Version 14.1

QUESTION 1
A _____ is used primarily to track the stability of the average value of a metric of interest.

A. NP Chart
B. Xbar-R Chart
C. I-MR Chart
D. C Chart

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 2
For her injection molding project a Belt needed to track the percentage of defectives of a particular sample set so she used a _____ to display the data?

A. Individual Chart
B. C Chart
C. Xbar Chart
D. P Chart

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 3
Which of these graphs demonstrates conditions which would be sufficient to enable OCAP for the process?

A. Xbar Chart
B. Time Series Chart
C. Neither
D. Both

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 4
Control Charts were developed by Dr. Shewhart to track data over time. To detect Special Cause variation the Control Charts use which of these?

A. Data shift analysis
B. Outlier analysis methods
C. Center Line and Control Limits
D. None of the above

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 5
Common and _____ Cause Variation are the focus of Statistical Process Control.

A. Uncommon
B. Ordinary
C. Special
D. Selective

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 6
Special Cause Variation falls into which two categories?

A. Natural & Unnatural

B. Short Term & Long Term

C. Assignable & Pattern

D. Attribute & Discreet

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 7
Range Charts are the technique used to determine if Special Causes are occurring within the subgroups of the _____.

A. Histograms

B. SPC Charts

C. NP Charts

D. Pareto Charts

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 8
If the production is for higher volume and monitoring and the Mean and variability is to be monitored for four machines producing product and the characteristic to be monitored is Variable Data, which SPC Chart is best to be selected?

A. Xbar-R Chart

B. Individual-MR Chart

C. NP Chart

D. CUSUM Chart

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 9
When a Belt Poka-Yoke's a defect out of the process entirely then she should track the activity with a robust SPC system on the characteristic of interest in the defect as an early warning system.

A. True
B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 10
Following the completion of a LSS project the Belt not only creates a Control Plan he also develops a _____ so those involved in the process know what to do when the critical metrics move out of spec.

A. Response Plan
B. Call List
C. Chain-of-Command
D. Defect Analysis Plan

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 11
The Control Limits width varies if the sample size varies for which type of chart?

A. P Charts
B. NP Charts
C. Xbar-R Charts
D. Time Series Charts

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 12
Which of these elements are not included in Implementation plans?

A. Work breakdown structure
B. Risk management plans
C. Cost/Benefit ratios
D. Planned audits of work completion

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 13
Upon completion and validation of an improvement to a process a Belt and the Project Team create a Control Plan that contains which of these?

A. Standard operating work description of the process change
B. Description of the monitoring system in place to assure continued compliance
C. Summary of the targeted critical metrics for process performance measurement
D. All of the above

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 14
What conclusion is most correct about the Experimental Design shown here with the response in the far right column?

Adv	Bev	Des	Crux	Response
-1	-1	-1	-1	20
1	-1	-1	1	14
-1	1	-1	1	17
1	1	-1	-1	10
-1	-1	1	1	19
1	-1	1	-1	13
-1	1	1	-1	14
1	1	1	1	10

A. No factor has enough statistical confidence greater than 95% to have an impact on the response rate

B. Constant, Adv and Bev are the only factors statistically affecting the response rate with 95% confidence or more

C. If the Adv is increased from the low level to the high level, the response rate increases

D. The response level is statistically concluded to only need the Adv and Bev factors set at the low level to get the largest response rate

E. This design does not have enough experimental runs to conclude anything as evidenced by the lack of P-values in the MINITABTM output
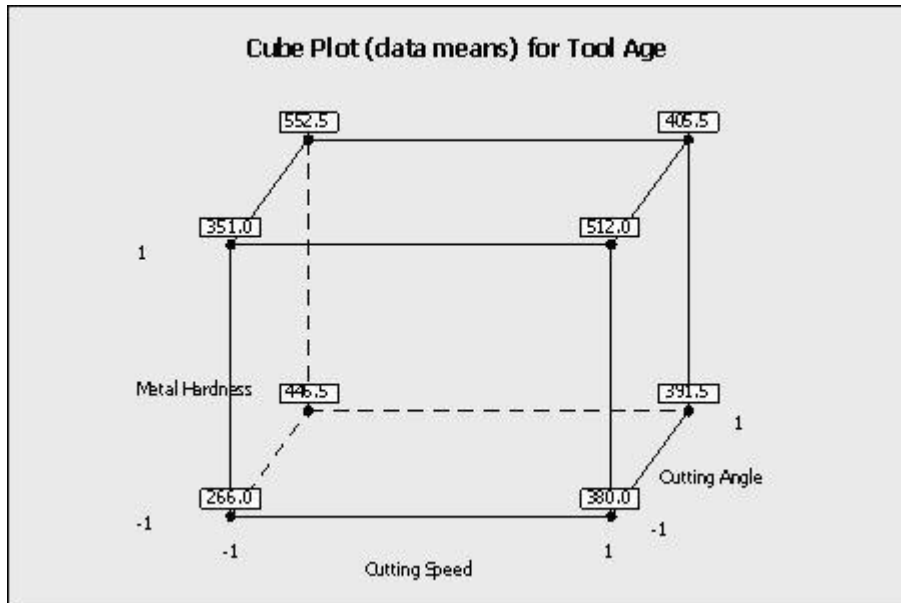
Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 15
Which statement(s) are correct about the Factorial Plot shown here? (Note: There are 3 correct answers).

Cube Plot (data means) for Tool Age

A. When the cutting speed increased from low to high level, the tool age increases
B. The coefficient of the metal hardness is positively related to the output of tool age
C. The coded coefficient is lower for cutting speed than the cutting angle related to the output of tool age
D. These plots prove a statistically significance factor with 95% confidence
E. These plots are an example of interaction plots

Correct Answer: ABC
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 16
How many experimental runs exist in a Full Factorial and fully randomized design for 4 factors with 2 replicates for the Corner Points and no Center Points? The factors in the experiment are only at 2- levels.

A. 10
B. 32
C. 256

D. 64

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 17
If an experiment has 5 factors and no replicates for a 2-level Experimental Design with 16 experimental runs which statement is incorrect?

A. The Experimental Design is half-fractional
B. The Main Effects are confounded with only 4-way interactions
C. The Main Effects for the 5 factors are not aliased or confounded but the 2-way interactions are confounded with the 3-way interactions
D. The experiment has 8 experimental runs with the first factor at the high level
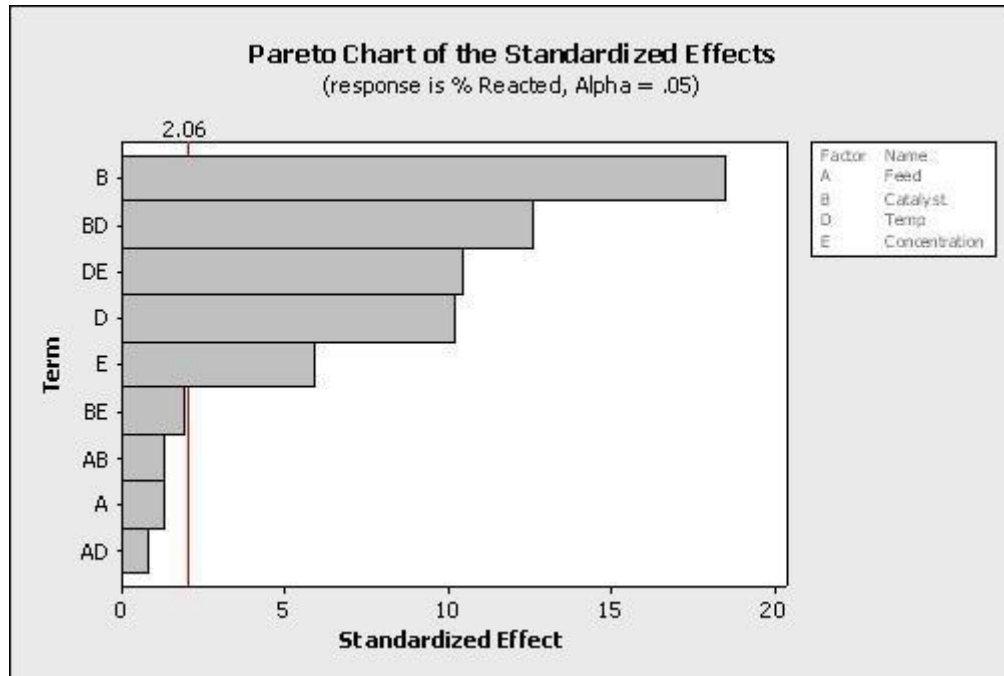
Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 18
Which statement(s) are correct about the Pareto Chart shown here for the DOE analysis? (Note: There are 2 correct answers).

Pareto Chart of the Standardized Effects
(response is % Reacted, Alpha = .05)

Factor | Name
A | Feed
B | Catalyst
D | Temp
E | Concentration

A. It is unknown from this graph how many factors were in the Experimental Design
B. The factors to keep in the mathematical model are E, D, DE, BD and B with an alpha risk equal to 2.06
C. The effects to keep in the mathematical model are E, D, DE, BD and B with an alpha risk equal to 0.05
D. The factors to keep in the mathematical model with a 5% alpha risk are BE, AB, A and AD

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 19
Fractional Factorial, _____and Response Surface Method are types of planned experiments.

A. Multi-Vari Analysis
B. Baldridge Channels
C. One Factor at a Time or OFAT

D. Factorial Design

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 20
Relative to a Design of Experiments the term _____ refers to variables being a linear combination of each other.

A. Mirror Image
B. Directly Parallel
C. Collinear
D. None of the above

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 21
Which statement(s) are incorrect about Fractional Factorial Designs?

A. A Half Fractional Design for 5 factors has the same number of experimental runs as a Full Factorial Design for 4 factors assuming no repeats or replicates or Center Points
B. Quarter Fractional experiments can exist for those with 4 factors
C. Resolution V design is desired while controlling costs of experimentation
D. Half Fractional experiments do not exist for those designs with only 2 factors

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 22

If in an experiment all possible variable pairs sum to zero the design is Orthogonal.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 23
Which Experimental Design typically is most associated with the fewest number of input variables or factors in the design?

A. Fractional Factorial design
B. Full Factorial design
C. Simple Linear Regression
D. Response Surface Design

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 24
The method of Steepest Ascent guides you toward a target inside the original inference space.

A. True
B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 25

Situations where standardized work needs to be incorporated include all of these except _____.

A. Machines continually operating to reduce the labor cost per piece
B. Lack of a system to assure proper inventory levels at repair stations
C. Changeover instructions incomplete
D. Process flow for the same product assembly taking various cycle time for completion

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 26
The Lean toolbox includes all of these items except _____.

A. Mistake Proofing
B. Visual Factory
C. Design of Experiments
D. Inventory Management

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 27
Questions that can be best answered by a Visual Factory include all of these except _____.

A. Are downtime issues easily noted?
B. Can extra inventory be seen easily?
C. Are unneeded tools or supplies easily noted?
D. Are setups optimized for lower scrap levels?

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 28
If a Six Sigma project was to reduce repair station inventory and the team found the inventory was creeping up over time which Lean tools should be considered in the Control Phase to reestablish and sustain the project success?

A. Review the Visual Factory to assure inventory in excess of desired visible
B. Improve the lighting to assure adequate visibility
C. Analyze data from supplier deliveries
D. Reword the standardized work instructions to use active verbs and not passive phrases

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 29
When a Belt implements an improvement that is automated thus requiring no particular understanding for use he has applied which Lean tool?

A. Mistake Proofing
B. Kaizen Event
C. 5S
D. None

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 30
Kaizens or Kaikakus and Six Sigma projects are intended to create incremental process improvements versus breakthrough, significant improvements.

A. True
B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 31
Which of these items contribute to what is necessary for successful Kaizen events?

A. Analysis tools
B. Management support
C. Operator support
D. All of these answers are correct

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 32
Kanban establishes a means of monitoring production, conveyance and delivery information such that efficient flow is established. The method used by Kanban is to require a _____ before anything moves.

A. Sign-off
B. Signal
C. Bell to ring
D. Work order

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 33
When a Belt decides to use written procedures and visual controls to improve the consistency of the tasks that must occur in the process he is

improving he has utilized the _____ activity of 5S.

A. Sustaining
B. Sorting
C. Standardizing
D. Straightening

Correct Answer: C
**Section: (none)**
Explanation

Explanation/Reference:
Explanation:

QUESTION 34
SPC Charts are used extensively in different business and decision-making environments. In this example a vendor is being selected based on speed of delivery. Which of the conclusions would help you pick a vendor for your needs regarding lead-time of delivery from your vendors? (Note: There are 4 correct answers).

Xbar-R Chart of Speed by Vendor
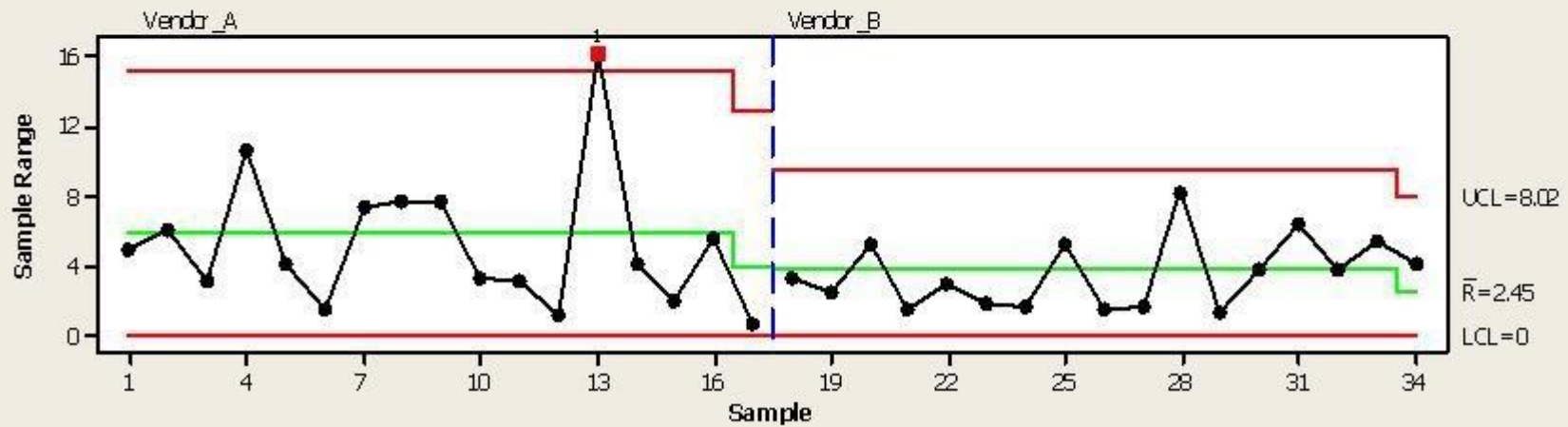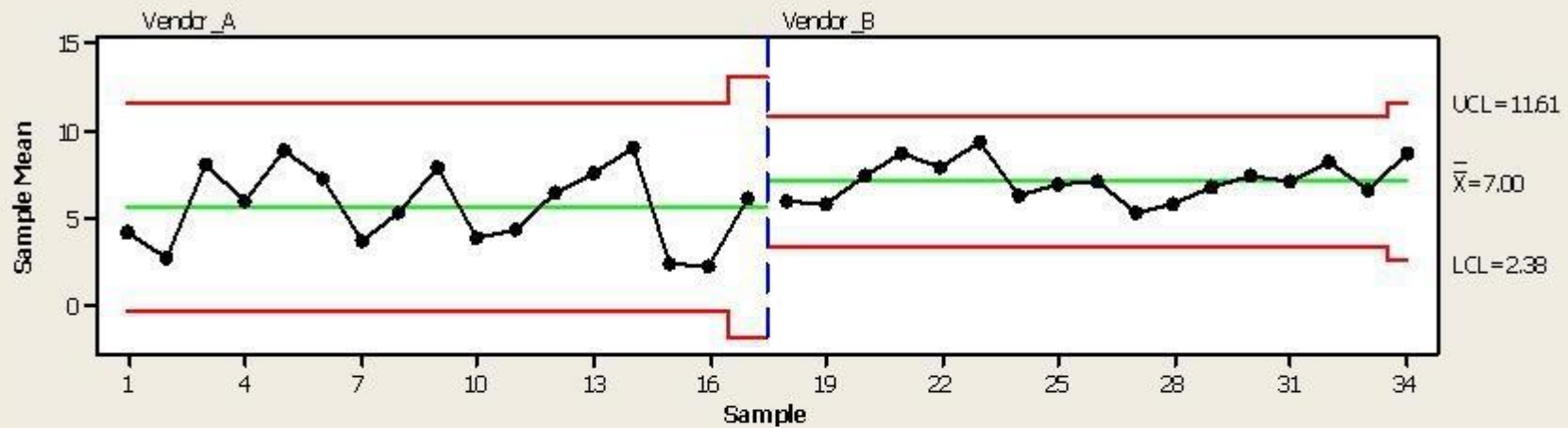
Tests performed with unequal sample sizes

A. Vendor A with a much shorter lead time in delivery
B. Vendor B as it has a better consistency (lower variance) on lead time

C. Vendor B as Vendor A shows a situation out of control as shown in red
D. Vendor B as the Control Limits are much narrower than Vendor A
E. Vendor B with higher lead time, but a process with much narrower Control Limits

Correct Answer: BCDE
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 35
Fractional Factorial designs are used to reduce the _____ because the number of runs has been lowered.

A. Time and cost of experiments
B. Number of people involved
C. Number of data measurement points
D. Output summary

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 36
Fractional Factorial Designs are used to analyze factors to model the output as a function of inputs if Hypothesis Testing in the Analyze Phase was inadequate to sufficiently narrow the factors that significantly impact the output(s).

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 37

A Factorial Experiment based on a Level 2 Design with 6 factors would require 16 runs to fully assess the interactions.

A. True

B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 38
A Full Factorial experiment using a 3 level 3 factor approach has been proposed to test the viability of an extrusion machine experiment. How many treatment combinations will this approach involve?

A. 6

B. 9

C. 27

D. 54

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 39
Screening experiments are the proper choice when a Belt is faced with the situation of highly Fractional Factorial Designs.

A. True

B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 40
A valid Multiple Linear Regression (MLR) is characterized by all of these except _____.

A. It is an assumption that the X's (inputs) are not correlated to each other
B. The X's (inputs) are assumed to be independent of each other
C. MLR is conducted based on a deliberate form of experimentation
D. The Residuals from MLR analysis have to be Normally Distributed
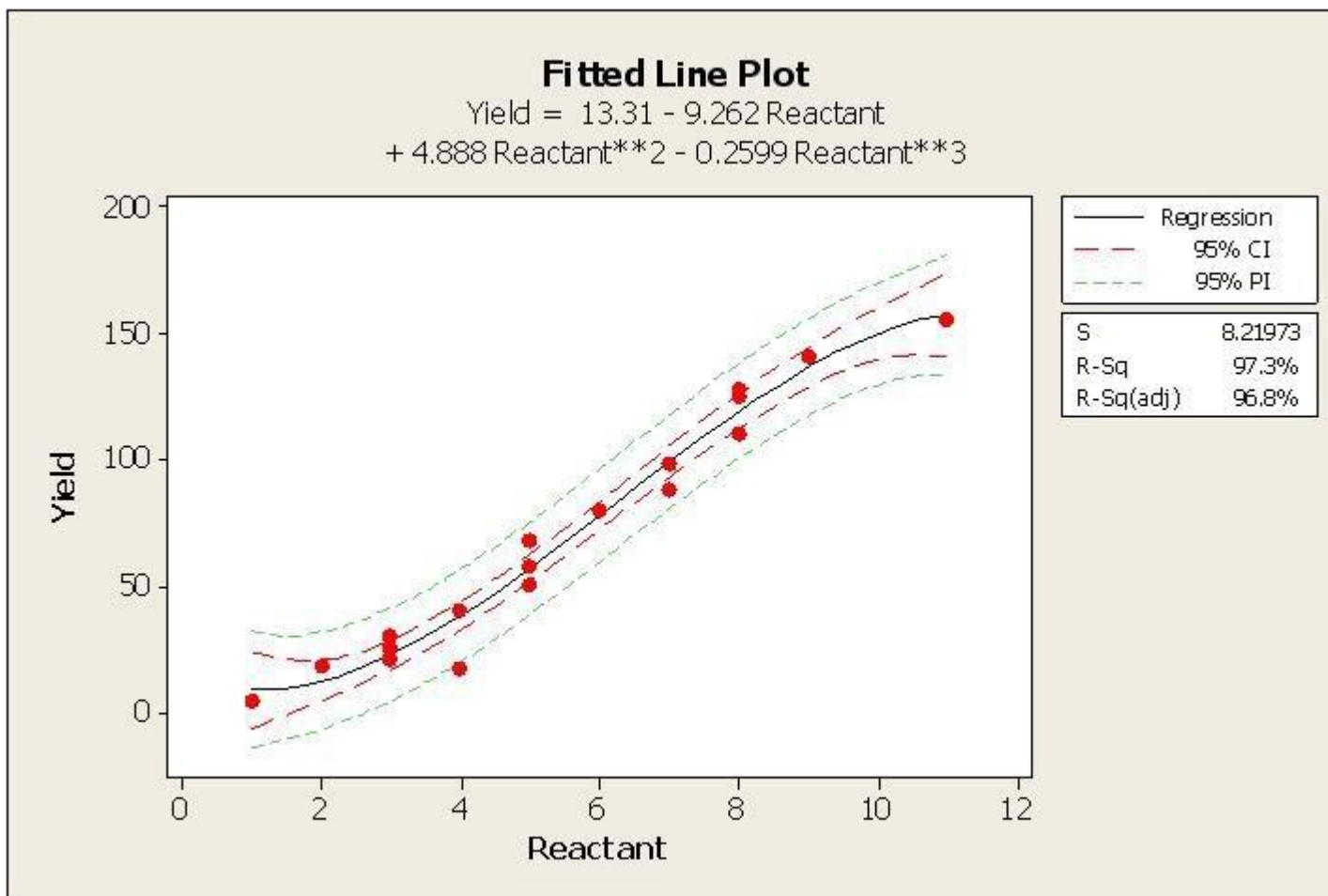
Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 41
Which statement is NOT correct about the Fitted Line Plot shown here?

Fitted Line Plot

Yield = 13.31 − 9.262 Reactant
+ 4.888 Reactant**2 − 0.2599 Reactant**3

A. The independent variable is the reactant
B. If the reactant was 6 units, with 95 % confidence we would expect a minimum yield of 100 units
C. With at least 95% confidence, we can expect less than 10 units of Yield when the reactant is at a value of 1
D. A reactant value between 2 and 4 units yields around 20 to 40
E. When the reactant increases, the expected yield would increase

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 42
When doing Hypothesis Testing on Non-normal data Belts will use a _____ to compare more than two sample proportions to each other.

A. Z score Table
B. Sakami Table
C. Mean-to-Mode Analysis
D. Contingency Table

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 43
It would be more likely than not for a Belt conducting a Regression Analysis to find that the _____.

A. r^2 value is smaller than the absolute value of r
B. Correlation Coefficient equals r^2
C. Coefficient of Determination is less than r^2
D. Correlation Coefficient equals r divided by 2

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 44
When a Belt properly analyzes the results of an experiment he must examine the Residuals in expectation of finding all of the following except
_____.

A. Some Residuals higher than others
B. Some Residuals lower than others

C. All Residuals within 2 Standard Deviations of the Mean

D. Residuals will represent a Linear Regression

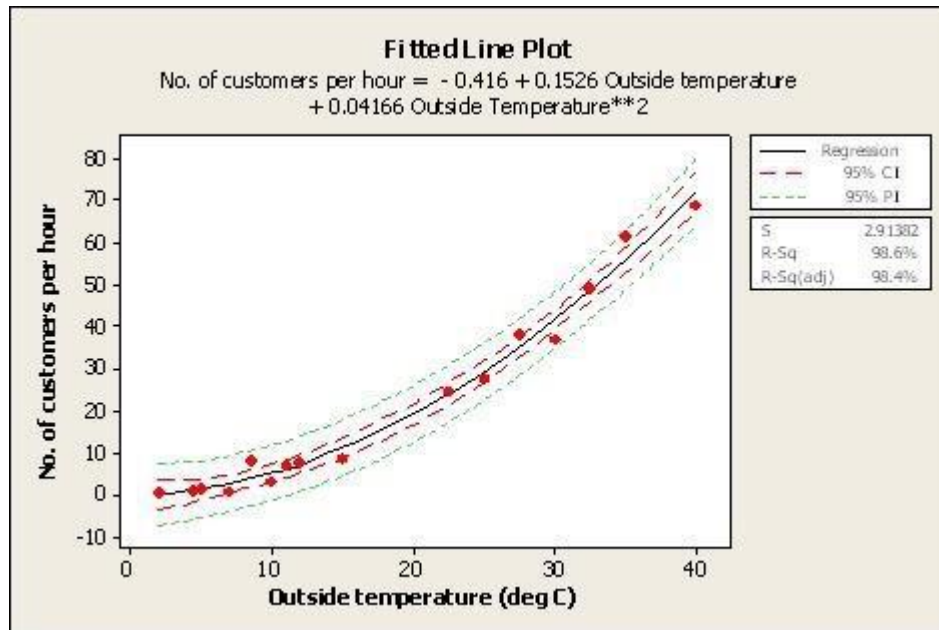**Correct Answer:** D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 45
Which statement(s) are correct about the Regression shown here? (Note: There are 2 correct answers).

A. The dependent variable is the outside temperature

B. The relationship between outside temperature and number of customers per hour is a Linear Regression

C. The dashed lines indicate with 95% confidence where all of the process data should fall between

D. The dashed lines indicate with 95% confidence the estimate for the Quadratic Regression Line

E. The predicted number of customers per hour is close to 5 if the outside temperature is 10 deg C

Correct Answer: DE
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 46
Which of these might contribute to similar distributions having Unequal Variance?

A. Extreme tails
B. Outliers
C. Multiple Modes
D. All of the above

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 47
A Belt working in a supply chain environment has to make a decision to change suppliers of critical raw materials for a new product upgrade. The purchasing manager is depending on the Belt's effort requiring that the average cost of an internal critical raw material component be less than or equal to $4,200 in order to stay within budget. Using a sample of 35 first article components, a Mean of the new product upgrade price of $4,060, and a Standard Deviation of $98 was estimated. Select the answer that best states the Practical Problem.

A. If the average cost per component is $4,200 or less, then the purchase manager will introduce the new product upgrade with new components.
B. If the average cost per component is greater than $4,200, then the purchase manager will introduce the new product upgrade with new components.
C. Only if the average cost per product upgrade is $4,060, will the purchase manager introduce new product upgrades with new components.
D. If the average cost per new product upgrade is less than $180, then the purchase manager will introduce the new product upgrade with new components.

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 48
A Belt working in a supply chain environment has to make a decision to change suppliers of critical raw materials for a new product upgrade. The purchasing manager is depending on the Belt's effort requiring that the average cost of an internal critical raw material component be less than or equal to $4,200 in order to stay within budget. Using a sample of 35 first article components, a Mean of the new product upgrade price of $4,060, and a Standard Deviation of $98 was estimated. The Alternative Hypothesis in the above example is?

A. The Standard Deviation is equal to $300.
B. The Mean is less than $4,320.
C. The Mean is equal to $4,060.
D. The Mean is less than $4,200.
E. The Mean is greater than $ 4,200.

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 49
A Belt working in a supply chain environment has to make a decision to change suppliers of critical raw materials for a new product upgrade. The purchasing manager is depending on the Belt's effort requiring that the average cost of an internal critical raw material component be less than or equal to $3,600 in order to stay within budget. Using a sample of 42 first article components, a Mean of the new product upgrade price of $3,200 and a Standard Deviation of $180 was estimated. Based on the data provided, the Z value for the data assuming a Normal Distribution is?

A. 1.11
B. 2.22
C. 4.30
D. 5.42

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 50
A Belt working in a supply chain environment has to make a decision to change suppliers of critical raw materials for a new product upgrade. The purchasing manager is depending on the Belt's effort requiring that the average cost of an internal critical raw material component be less than or equal to $3,800 in order to stay within budget. Using a sample of 38 first article components, a Mean of the new product upgrade price of $3,680, and a

Standard Deviation of $120 was estimated. In order to increase the Long Term Z value to 5, what is the maximum long term variation in pricing the Belt can accept for his upgraded critical raw material component?

A. $6
B. $12
C. $24
D. $48

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 51
Sally and Sara sell flower pots at their garage sale. Sally motivates Sara mentioning that they will sell a minimum of 15 pots per day if the outside temperature exceeds 60o F. From a sample, whose population is assumed to follow a Normal Distribution, taken for 30 days at 60 degrees or more an average of 13.6 pots per day were sold with a Standard Deviation of 0.7 pots. For the sales accomplished above, what test would validate if they met their requirements?

A. F Test
B. Test for Equal Variance
C. Chi Square Test
D. One-Sample t-Test

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 52
Sally and Sara sell flower pots at their garage sale. Sally motivates Sara mentioning that they will sell a minimum of 15 pots per day if the outside temperature exceeds 60o F. From a sample, whose population is assumed to follow a Normal Distribution, taken for 30 days at 60 degrees or more an average of 13.6 pots per day were sold with a Standard Deviation of 0.7 pots. The statistical Degrees of Freedom for this example are?

A. 1
B. 29

C. 30

D. 31

E. 2

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 53
Sally and Sara sell flower pots at their garage sale. Martha motivates Rose mentioning that they will sell a minimum of 16 pots per day if the outside temperature exceeds 60o F. From a sample, whose population is assumed to follow a Normal Distribution, taken for 30 days at 60 degrees or more an average of 15.2 pots per day were sold with a Standard Deviation of 0.6 pots. What is the Z value for this sales process?

A. 0.67

B. 1.13

C. 1.33

D. 2.66

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 54
The relationship between a response variable and one or more independent variables is investigated and modeled by use of _____.

A. X-Y Matrix

B. Baldridge Assessment

C. Analysis of Variance (ANOVA)

D. Critical X's Definition

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 55
An ANOVA used across many dependent variables could increase the Beta risk.

A. True
B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 56
The Mann-Whitney test is a powerful test and is unique to situations from which of the choices listed? (Note: There are 2 correct answers).

A. Testing the identity of two populations
B. Focuses on equality of the Median of the two populations
C. Less powerful than the traditional "t-test"
D. More widely applicable than the traditional "t-test"

Correct Answer: BD
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 57
Assessing process proportion as opposed to evaluating a process with respect to a set target can be done using which of these?

A. Process proportion equals some value range
B. Process proportion equals some desired value
C. Target is current
D. Proportion of the tail is equal

Correct Answer: B

Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 58
A Non-parametric Test should be used if just one distribution is not Normal out of the two or more gathered.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 59
Contingency Tables are used to test for association, or dependency, between two or more classifications.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 60
For the data shown here which statement(s) are true? (Note: There are 2 correct answers).

Grade A	Grade B	Grade C
0.917	1.1	0.63
0.68	0.173	4.17
1.74	0.24	0.6
0.3	0.67	0.84
0.33	6.94	0.22
4.13		

A. With 95% confidence, we cannot conclude if the samples are from three Normal Distributions.
B. With greater than 95% confidence, we conclude the samples are from Non-normal Distributions.
C. If we wanted to compare the Central Tendencies of these three samples we would use the one way ANOVA test.
D. If we wanted to compare the Central Tendencies of these three samples we could use Mood's Median test.

Correct Answer: BD
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 61
A(n) _____ is best used to compare a Machine 1 average quality characteristic to the same quality characteristic of Machine 2.

A. F test
B. 1-Sample t-test
C. 2-Sample t-test
D. ANOVA test

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 62
For the data set shown here which of these statements is/are true?

Grade A	Grade B	Grade C
0.917	1.1	0.63
0.68	0.173	4.17
1.74	0.24	0.6
0.3	0.67	0.84
0.33	6.94	0.22
4.13		

A. Hypothesis Testing of Means or Medians cannot be done since there are an unequal number of observations for the 3 samples
B. A Paired T-test would be applicable for comparing Grade B and Grade A since they follow each other in the data set
C. Grade A has the lowest sample Mean of the 3 samples
D. Grade A has a higher sample Mean than Grade B
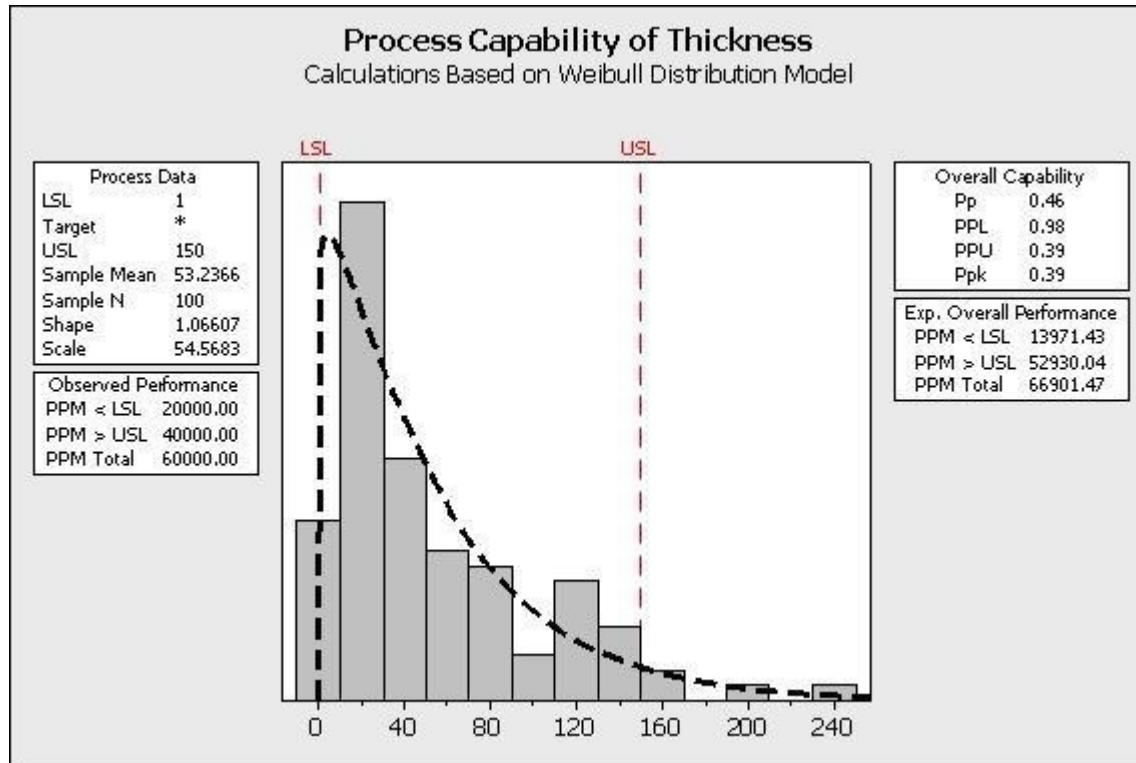
Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 63
Review the analysis shown here.

Process Capability of Thickness
Calculations Based on Weibull Distribution Model

Process Data
LSL	1
Target	*
USL	150
Sample Mean	53.2366
Sample N	100
Shape	1.06607
Scale	54.5683

Observed Performance
PPM < LSL	20000.00
PPM > USL	40000.00
PPM Total	60000.00

Overall Capability
Pp	0.46
PPL	0.98
PPU	0.39
Ppk	0.39

Exp. Overall Performance
PPM < LSL	13971.43
PPM > USL	52930.04
PPM Total	66901.47

Which statements are true about the process? (Note: There are 3 correct answers).

A. The initial focus for this project would be to determine why the thicknesses are so frequently too low.
B. The majority of the process is closer to the lower specification limit.
C. This process is described with the Weibull Distribution.
D. The process has more problems with Variation than Centering.
E. The process follows a non-normal distribution with the given data.
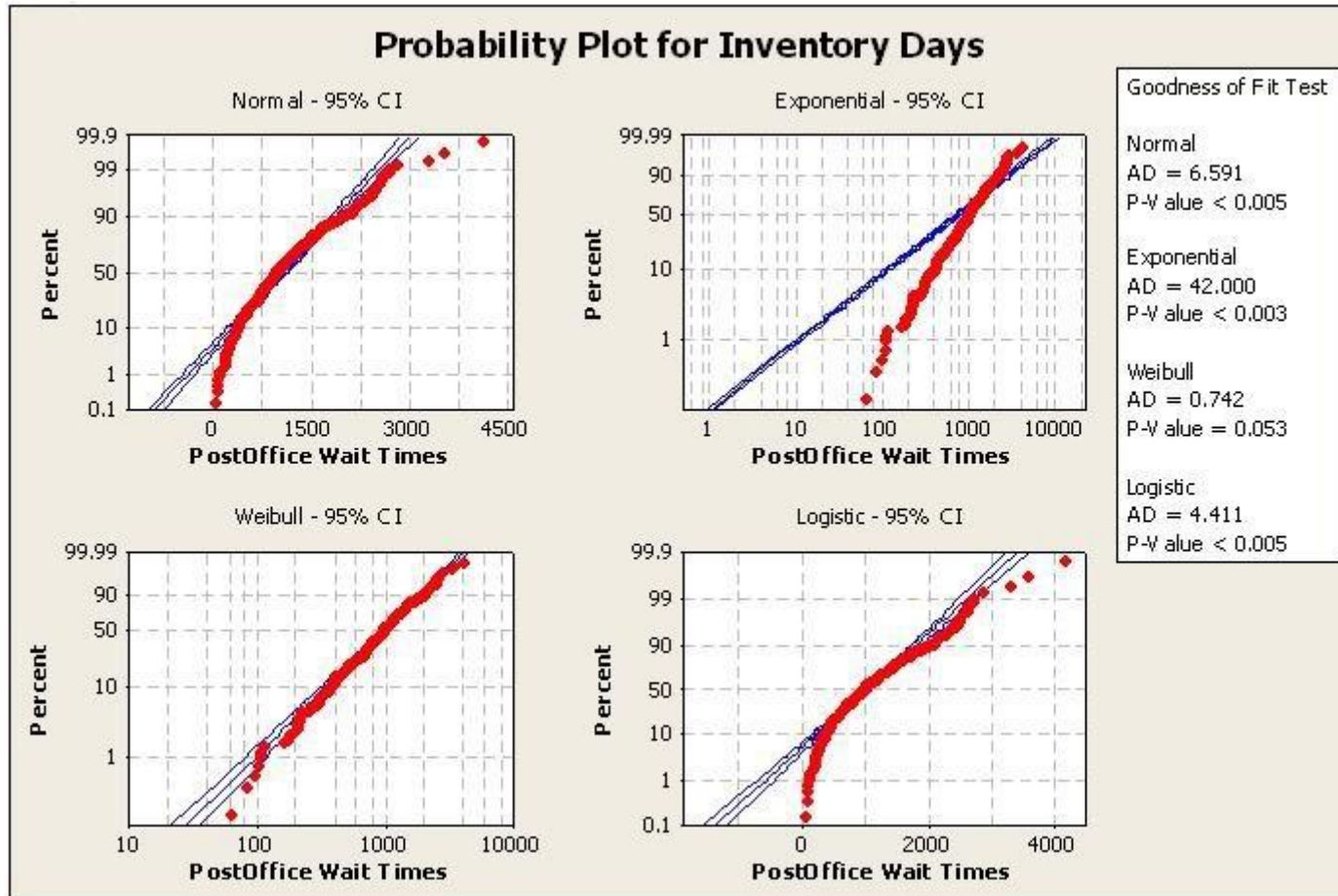
Correct Answer: BDE
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 64
A Lean Six Sigma project is attempting to reduce inventory days. The Process Capability will be monitored as part of the Control Phase to track the sustainability of the improvement.

Probability Plot for Inventory Days

Which distribution type is best used for performing the Capability Analysis?

A. Weibull Distribution
B. Normal Distribution
C. Exponential Distribution
D. Logistic Distribution

E. Gaussian Distribution

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 65
What conclusion is most correct about the Experimental Design shown here with the response in the far right column?

Adv	Bev	Des	Crux	Response
-1	-1	-1	-1	20
1	-1	-1	1	14
-1	1	-1	1	17
1	1	-1	-1	10
-1	-1	1	1	19
1	-1	1	-1	13
-1	1	1	-1	14
1	1	1	1	10

A. No factor has enough statistical confidence greater than 95% to have an impact on the response rate
B. Constant, Adv and Bev are the only factors statistically affecting the response rate with 95% confidence or more
C. If the Adv is increased from the low level to the high level, the response rate increases
D. The response level is statistically concluded to only need the Adv and Bev factors set at the low level to get the largest response rate
E. This design does not have enough experimental runs to conclude anything as evidenced by the lack of P-values in the MINITABTM output

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 66
A(n) _____ has occurred when two inputs have a greater impact on a change in the output than either of the inputs has by itself.

A. Dependency

B. Bimodal reaction

C. Interaction

D. Amplified effect

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 67
When conducting a Hypothesis Test using Continuous Data the proper sample size is influenced by the extent to which we need to assess a Difference to be detected and the inherent variation in the process.

A. True

B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 68
The validity of the decision made with Hypothesis Testing is dependent upon all of these except _____.

A. Beta risk

B. Alpha risk

C. Range of data

D. Sample size

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 69

Statistical Difference is the magnitude of difference or change required to distinguish between a true difference, brought about by change or improvement, and one that could have occurred by chance.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 70
To be an effective Lean Six Sigma practitioner one must understand the difference between _____.

A. ANOVA and the Analysis of Variance
B. Nonparametric tests and tests of Non-normal Data
C. F-test and test of variances of 2 samples
D. Practical and Statistical significance

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 71
The class score distribution of schools in a metropolitan area is shown here along with an analysis output. Comment on the statistical significance between the Means of the two distributions. Select the most appropriate statement.

A. The two class Means are statistically different from each other
B. The two class Means statistically not different from each other
C. Inadequate information on class Means to make any statistical conclusions
D. A visual comparison shows that class Means are not statistically different
E. A visual comparison shows that class Means are statistically different

Correct Answer: A
Section: (none)

Explanation

Explanation/Reference:
Explanation:

QUESTION 72
A _____ is used primarily to track the stability of the average value of a metric of interest.

A. NP Chart
B. Xbar-R Chart
C. I-MR Chart
D. C Chart

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 73
For her injection molding project a Belt needed to track the percentage of defectives of a particular sample set so she used a _____ to display the data?

A. Individual Chart
B. C Chart
C. Xbar Chart
D. P Chart

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 74
Which of these graphs demonstrates conditions which would be sufficient to enable OCAP for the process?

A. Xbar Chart

B. Time Series Chart

C. Neither

D. Both

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 75
How many experimental runs exist in a Full Factorial and fully randomized design for 5 factors with 2 replicates for the Corner Points and no Center Points? The factors in the experiment are only at 2- levels.

A. 10

B. 128

C. 256

D. 64

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 76
If an experiment has 5 factors and no replicates for a 2-level Experimental Design with 16 experimental runs which statement(s) are correct? (Note: There are 3 correct answers).

A. The Main Effects for the 5 factors are not aliased or confounded but the 2-way interactions are confounded with the 3-way interactions

B. The Main Effects are confounded with only 4-way interactions

C. The Experimental Design is half-fractional

D. The experiment has 8 experimental runs with the first factor at the high level

E. The experiment has only 4 experimental runs with the 5th factor at the high level
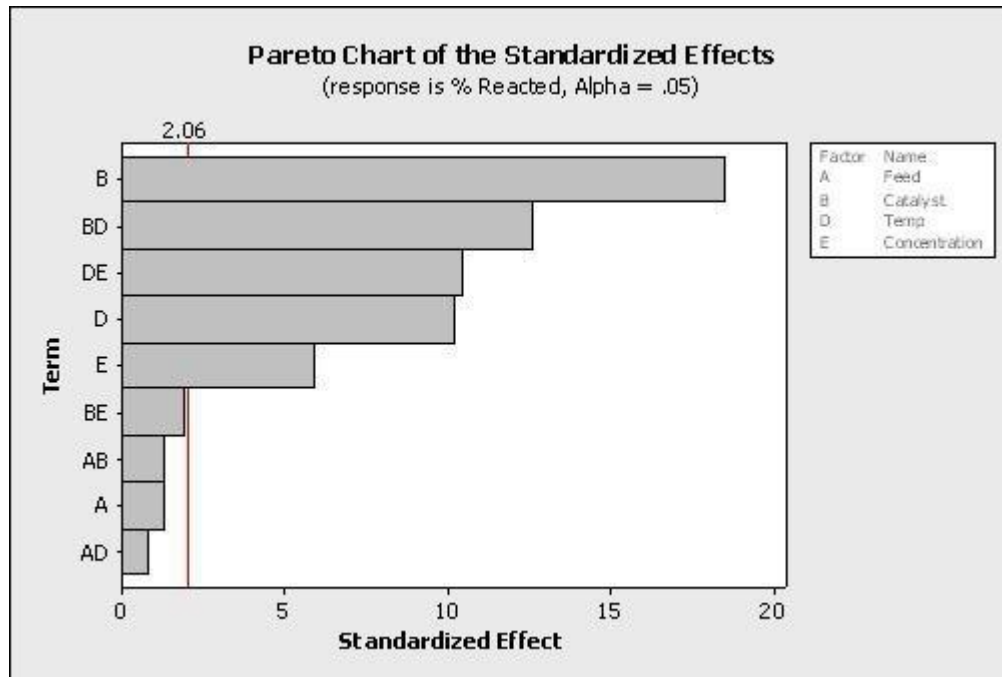
Correct Answer: BCD
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 77
Which statement(s) are correct about the Pareto Chart shown here for the DOE analysis? (Note: There are 2 correct answers).

Pareto Chart of the Standardized Effects
(response is % Reacted, Alpha = .05)

A. It is unknown from this graph how many factors were in the Experimental Design
B. The factors to keep in the mathematical model are E, D, DE, BD and B with an alpha risk equal to 2.06
C. The effects to keep in the mathematical model are E, D, DE, BD and B with an alpha risk equal to 0.05
D. The factors to keep in the mathematical model with a 5% alpha risk are BE, AB, A and AD

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 78
With Measurement System Analysis we are concerned with two issues that impact the potential variability of the data. They are _____ and Accuracy.

A. Spread
B. Reliability
C. Precision
D. Deflection

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 79
An operator is measuring the distance between two points. Which is most likely to be influenced by the operator?

A. Precision of the measurement
B. Accuracy of the measurement
C. Calibration of the instrument
D. All of these answers are correct

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 80
Accuracy can be assessed in several ways and a fairly accurate means of measurement is visual comparison.

A. True
B. False

Correct Answer: B
Section: (none)

Explanation

Explanation/Reference:
Explanation:

QUESTION 81
Measurement _____ is defined as the difference between the observed and the expected values for a given set of data.

A. Breadth
B. Linearity
C. Range
D. Bias

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 82
Appropriate measures means that measurements are _____.

A. Representative
B. Sufficient
C. Contextual
D. Relevant
E. All of these answers are correct

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 83
A _____ problem in the Measurement System suggests that there is a lack of consistency in the measurement over time.

A. Linearity

B. Bias
C. Stability
D. Magnitude

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 84
An operator checks that all boxes being packed contain enough products to fill the box. However, each box getting filled has a different number of products in it. This is a Reproducibility problem, not a Repeatability problem.

A. True
B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 85
In a good Measurement System the most variation will be with part-to-part measurements. What should you do if the majority of variation is associated with the Gage R&R assuming the gage is technically capable?

A. Focus on fixing the Repeatability and Reproducibility of the measurement device
B. Purchase a new machine
C. Focus on trimming the Part-to-Part variation
D. Run another MSA test with the machine

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 86
What aspects of Measurement Systems Analysis (MSA) studies are applicable when the process used to measure does not damage the part?

A. Destructive variable gage R&R and Crossed Study
B. Destructive variable gage R&R and Nested Study
C. Nondestructive variable gage R&R and Crossed Study
D. Nondestructive variable gage R&R and Nested Study

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 87
Each of the items listed would impact the Process Capability for a process with a continuous output except _____.

A. Shape of process data distribution (e.g. Normal Distribution)
B. Process Technology
C. Process Standard Deviation
D. Seasonal variation in process

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 88
For Attribute Data, Process Capability is defined as the average proportion of nonconforming products.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 89
The reported Cpk for a process with an average of 104 units, a spread of 18 units and upper and lower specification limits of 122 and 96 units would be?

A. 0.5
B. 0.89
C. 1.00
D. 2.00

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 90
When we compare short-term and long-term Capability which of these is true?

A. Cp is better for the short term
B. Both short-term and long-term performance are alike
C. Performance tends to improve over time
D. Cp is better for the long-term

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 91
What is the Ppk of a process with a spread of 24 units, an average of 68, an upper limit of 82 and a lower limit of 54?

A. 1.68
B. 2.00
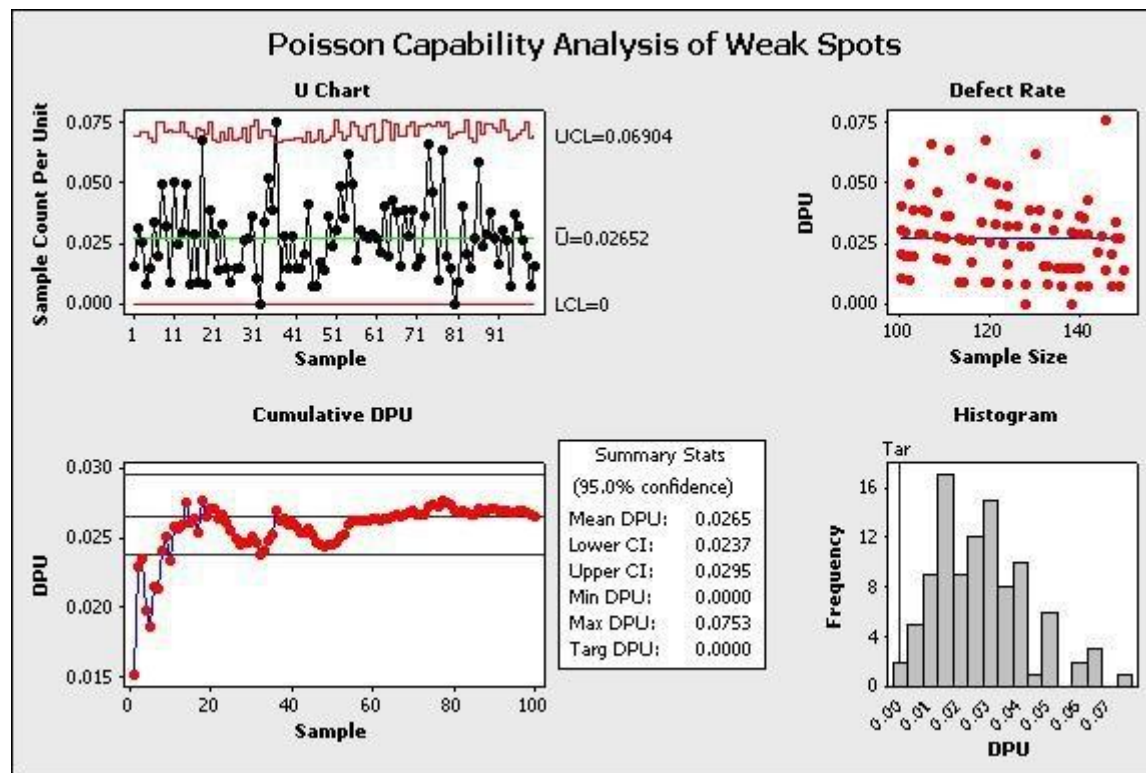C. 4.00

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 92
Which statements are correct about the advanced Capability Analysis shown here?

Poisson Capability Analysis of Weak Spots

(Note: There are 3 correct answers).

A. This is a Poisson Capability Analysis.
B. The average DPU with 95% confidence is between 0.024 and 0.0295.

C. The DPU does not seem to vary depending on sample size.
D. The process shows only one instance of being out of control statistically so we have confidence in the estimated DPU of this process.
E. The maximum DPU in one observation was nearly 0.0753.

Correct Answer: BCE
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 93
Common and Special Cause _____ are the focus of Statistical Process Control.

A. Prediction
B. Ideation
C. Capability
D. Variation

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 94
Special Cause Variation falls into which two categories? (Note: There are 2 correct answers).

A. Natural
B. Short term
C. Assignable
D. Pattern

Correct Answer: CD
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 95
Control Charts were developed by Dr. Shewhart to track data over time. To detect Special Cause variation the Control Charts use which of these?

A. Data shift analysis
B. Outlier analysis methods
C. Center Line and Control Limits
D. None of the above

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 96
If the production is for higher volume and monitoring and the Mean and variability is to be monitored for four machines producing product and the characteristic to be monitored is Variable Data, which SPC Chart is best to be selected?

A. Xbar-R Chart
B. Individual-MR Chart
C. NP Chart
D. CUSUM Chart

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 97
If you can Poka-Yoke a defect out of the process entirely then you do not need use SPC on the characteristic of interest in the defect.

A. True
B. False

Correct Answer: A
Section: (none)

Explanation

Explanation/Reference:
Explanation:

QUESTION 98
Range Charts are the technique used to determine if _____ are occurring within the subgroups of the SPC Charts.

A. Common Causes
B. Special inspections
C. Unnatural forces
D. Special Causes

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 99
If a process has subgroups for Variable data and the process runs for a long period of time, then the best pair of SPC Charts to use would be an Xbar and _____.

A. NP Chart
B. Individuals Chart
C. R Chart
D. C Chart

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 100
The Control Limits width varies if the sample size varies for which type of chart?

A. P Charts

B. NP Charts

C. Xbar-R Charts

D. Time Series Charts

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 101
Which of these elements are not included in Implementation plans?

A. Work breakdown structure

B. Cost/Benefit ratios

C. Risk management plans

D. Planned audits of work completion

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 102
Following the completion of a LSS project the Belt not only creates a Control Plan he also develops a _____ so those involved in the process know what to do when the critical metrics move out of spec.

A. Response Plan

B. Call List

C. Chain-of-Command

D. Defect Analysis Plan

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:

Explanation:

QUESTION 103
Six Sigma is a business improvement discipline whose fundamental view is based on a _____ oriented approach of the business.

A. Profit
B. Performance
C. Process
D. Predatory

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 104
Much of the Six Sigma methodology is used to identify and remove causes for _____ .

A. Process Variation
B. Material Costs
C. Excess Inventory
D. Lost Sales

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 105
When variation is removed from the output of a process then the process customer can have more confidence in the experience that results from the process.

A. True
B. False

Correct Answer: A

QUESTION 106
The distance between the Mean of a data set and the Point of Inflection on a Normal curve is called the _____.

A. Curve Spread
B. Standard Deviation
C. Numerical Average
D. Data Breadth

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 107
One of the foundations of Lean Six Sigma is the concept that the output of a process (Y) is influenced by the process inputs (X's) and is commonly shown as which formula?

A. $Y = Z(X2)$
B. $Y = f(X3)$
C. $Y = f(Xn)$
D. $Y = g(X+ 1.5)$

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 108
When we gather information for the Voice of the Business we are primarily interested in information concerning the _____ of the business.

A. Advertising budget

B. Market share
C. Profitability
D. Ownership

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 109
When a Belt creates a Process Map she will use a _____ to depict a decision point requiring a Yes or No decision.

A. Circle
B. Square
C. Diamond
D. Rectangle

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 110
Which Element of Waste best describes "the unnecessary movement of materials and goods"?

A. Overprocessing
B. Inventory
C. Motion
D. Conveyance

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 111
A Belt rearranged the location of the parts inventory for a rework station locating the most often used parts to be within hand reach of the repair person.
This rearrangement resulted in quicker repair times by eliminating one of seven major elements of waste which is the Waste of _____.

A. Motion
B. Conveyance
C. Inventory
D. Waiting

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 112
The Japanese born function of a Kanban event utilizes a specific, step-by-step approach meant to bring about major changes to a process.

A. True
B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 113
The primary objective in removal of waste is to improve the Order Production Cycle where the time from _____ to the time of receipt of payment is compressed.

A. Shift start
B. Product development
C. Receipt of an order
D. New fiscal year

Correct Answer: C

Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 114
Handling of warranty returns, process improvement team meetings and rework to meet customer expectations are all examples of business costs that are classified as _____ .

A. Nuisance
B. Non-value Add
C. Necessary
D. Unavoidable

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 115
At the very initiation of a project a Belt must develop a concise _____ that states at a high level the area of concern and why it is important this issue be improved.

A. Business Case
B. Project Doctrine
C. Management Justification
D. Process Owner Disclosure

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 116
The English words used for the 5S's are Sorting, Straightening, _____ , _____ and Sustaining. (Note: There are 2 correct answers).

A. Shaping
B. Shining
C. Standardizing
D. Signing

Correct Answer: BC
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 117
An example of the waste of mismanaged Inventory is _____.

A. Capital costs of money
B. Value decrease from aged inventory
C. Cost of storage space
D. All of these answers are correct

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 118
In a Fishbone Diagram the 6M's stand for Methods, _____, Machine, Man, Mother Nature and Materials.

A. Measurements
B. Merger
C. Management
D. Medical

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:

Explanation:

QUESTION 119
A dock worker for a feed supplier was tasked with assuring the proper weight in the feed bags as they left the dock. One of the columns listed the range of weight of the bags included in the studies. This required plotting a Histogram of the weight of the bags. While drawing the Histogram the x-axis contained a certain scale of data. Pick the scale of data that is appropriate for Histograms.

A. Ordinal Scale Data
B. Interval Scale Data
C. Nominal Scale Data
D. Ration Scale Data

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 120
The _____ is the most frequently occurring value in a distribution of data.

A. Median
B. Mean
C. Center Point
D. Mode

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 121
Use this data to calculate the Z Score. Average of: 92, Standard Deviation: 2, Upper Spec Limit: 101

A. 0.75
B. 1.5
C. 2.25

D. 4.50

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 122
If a Belt needed to model the data for the number of weaves in section of carpet fabric she would use the _____ Distribution approach.

A. Poisson
B. Extended
C. Exponential
D. Weibull

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 123
When analyzing the behavior of our process to assess customer satisfaction we are concerned about both the variation such that it stays within the spec limits and how well the Mean is _____ the process requirements.

A. Balanced against
B. Over and above
C. Twice as great as
D. Centered relative to

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 124

Using this partial Z Table, how many units from a month's production run are expected to not satisfy customer requirements for the following process?
Upper specification limit: 8.4 Lower specification limit: 4.7 Mean of the process: 6.2 Standard Deviation: 2.2 Monthly production: 360 units

A. 8
B. 13
C. 28
D. 57

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 125
A Full Factorial experiment using a 2 level 4 factor approach has been proposed to test the viability of an extrusion machine experiment. How many treatment combinations will this approach involve?

A. 8
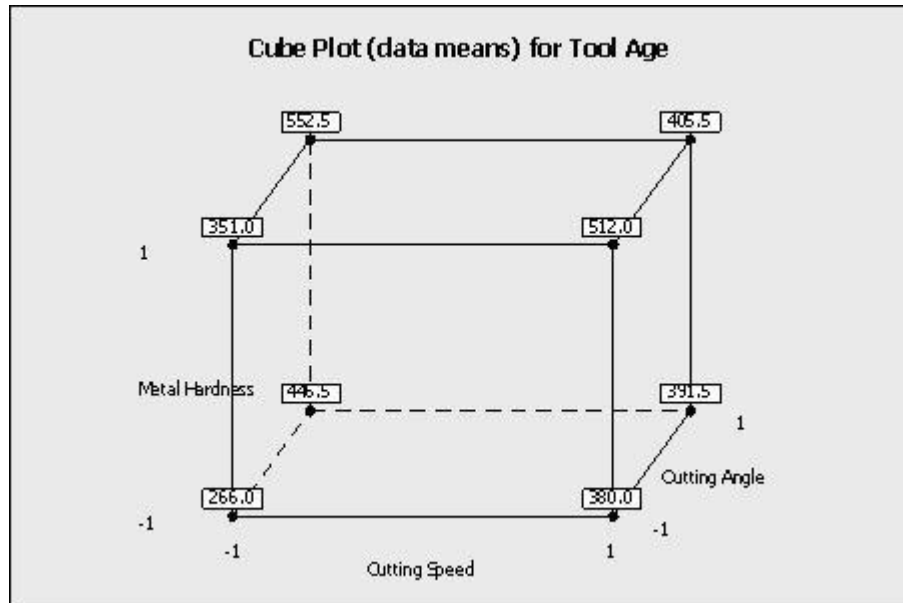B. 16
C. 32
D. 64

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 126
Which statement(s) are correct about the Factorial Plot shown here? (Note: There are 3 correct answers).

A. When the cutting speed increased from low to high level, the tool age increases
B. The coefficient of the metal hardness is positively related to the output of tool age
C. The coded coefficient is lower for cutting speed than the cutting angle related to the output of tool age
D. These plots prove a statistically significance factor with 95% confidence
E. These plots are an example of interaction plots

Correct Answer: ABC
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 127
Which statement(s) are incorrect for the Regression Analysis shown here? (Note: There are 2 correct answers).

Regression Analysis: Turbine Output versus Air-Fuel Ratio, % steam, ...

```
The Regression Equation is
TurbineOutput = 16.5 + 3.21 Air-Fuel Ratio + 0.386 % methane
                + 0.0166 SteamExitTemp

Predictor          Coef    SE Coef      T       P
Constant         16.488     2.918     5.65   0.000
Air-Fuel Ratio    3.2148    0.2377   13.52   0.000
% methane         0.38637   0.07278   5.31   0.000
SteamExitTemp     0.016576  0.004273  3.88   0.004

S = 0.508616   R-Sq = 98.6%   R-Sq(adj) = 98.2%
Analysis of Variance
Source         DF      SS       MS      F       P
Regression      3  170.003   56.668  219.06  0.000
Residual Error  9    2.328    0.259
Total          12  172.331

Source         DF    Seq SS
Air-Fuel Ratio  1   159.048
% methane       1     7.062
SteamExitTemp   1     3.892
```

A. The air-fuel ratio explains most of the TurbineOutput variation
B. The Regression explains over 98% of the process variation
C. This Multiple Linear Regression has three statistically significant independent variables
D. If the air-fuel ratio increases by 1, the TurbineOutput more than triples
E. The SteamExitTemp explains the most variation of the TurbineOutput

Correct Answer: DE
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 128
Fractional Factorial Designs are used to analyze factors to model the output as a function of inputs if Hypothesis Testing in the Analyze Phase was inadequate to sufficiently narrow the factors that significantly impact the output(s).

A. True
B. False

Correct Answer: A

Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 129
Fractional Factorial designs are used to reduce the time and cost of experiments because the _____ has been lowered.

A. Number of data measurement points
B. Number of runs
C. People involved
D. Output summary

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 130
A Factorial Experiment based on a Level 2 Design with 4 factors would require 16 runs to fully assess the interactions.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 131
Screening experiments are the proper choice when a Belt is faced with the situation of highly Fractional Factorial Designs.
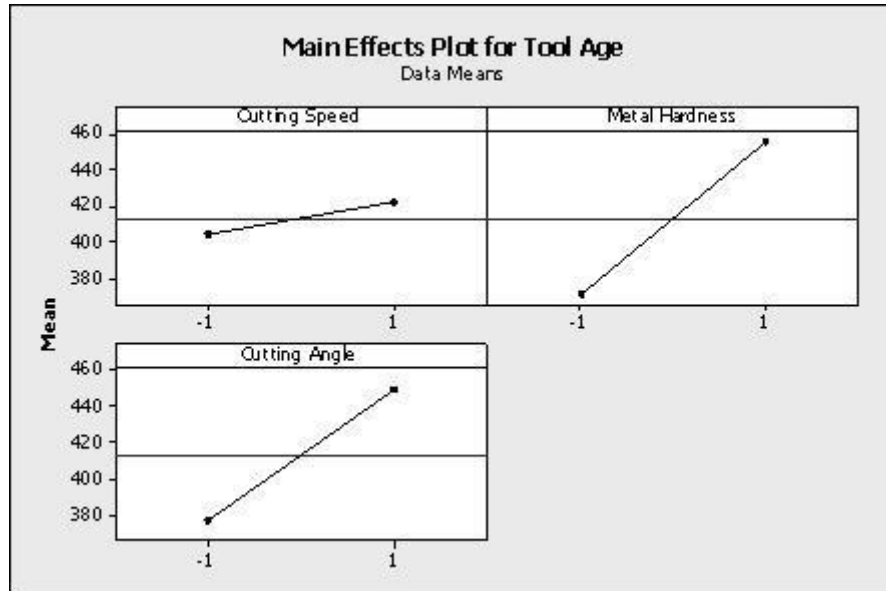
A. True
B. False

Correct Answer: A

Explanation/Reference:
Explanation:

QUESTION 132
Which statement(s) are correct about the DOE Factorial plot output here? (Note: There are 3 correct answers).

Main Effects Plot for Tool Age
Data Means

A. Two factors were operated at 3 levels each
B. The highest tool age was achieved with metal hardness at high level while keeping the cutting speed at the low level
C. The design indicated above is a 32 factorial design
D. The cutting speed and cutting angle are at the low level for the least tool age achieved
E. All factors had 2 levels in the experiment

Correct Answer: BCE
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 133
Which statement is most correct for the Regression Analysis shown here?

Regression Analysis: Turbine Output versus Air-Fuel Ratio, % steam, ...
```
The Regression Equation is
TurbineOutput = 16.5 + 3.21 Air-Fuel Ratio + 0.386 % methane
               + 0.0166 SteamExitTemp

Predictor          Coef    SE Coef      T      P
Constant          16.488     2.918    5.65  0.000
Air-Fuel Ratio     3.2148    0.2377  13.52  0.000
% methane          0.38637   0.07278  5.31  0.000
SteamExitTemp      0.016576  0.004273  3.88  0.004

S = 0.508616   R-Sq = 98.6%   R-Sq(adj) = 98.2%
Analysis of Variance
Source          DF       SS       MS        F      P
Regression       3  170.003   56.668  219.06  0.000
Residual Error   9    2.328    0.259
Total           12  172.331

Source          DF    Seq SS
Air-Fuel Ratio   1  159.048
% methane        1    7.062
SteamExitTemp    1    3.892
```

A. The Regression explains 50.8% of the process variation
B. The air-fuel ratio explains most of the TurbineOutput variation
C. This Simple Linear Regression explains 98+% of the process variation
D. This Multiple Linear Regression has four statistically significant independent variables

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 134
A(n) _____ is best used to compare a Machine 1 average quality characteristic to the same quality characteristic of Machine 2.

A. 1-Sample t-test
B. 2-Sample t-test

C. F test

D. ANOVA test

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 135
For the data set shown here which of these statements is/are true?

Grade A	Grade B	Grade C
0.917	1.1	0.63
0.68	0.173	4.17
1.74	0.24	0.6
0.3	0.67	0.84
0.33	6.94	0.22
4.13		

A. Hypothesis Testing of Means or Medians cannot be done since there are an unequal number of observations for the 3 samples

B. A Paired T-test would be applicable for comparing Grade B and Grade A since they follow each other in the data set

C. Grade A has the lowest sample Mean of the 3 samples

D. Grade A has a higher sample Mean than Grade B

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 136
Assessing process proportion as opposed to evaluating a process with respect to a set target can be done using one or more of these. (Note: There are 2 correct answers).

A. Process proportion equals some desired value

B. Process proportion equals some value range
C. Target is current
D. When we deal with Attribute type data
E. Proportion of the tail is equal

Correct Answer: AD
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 137
For the data shown here which statement(s) are true? (Note: There are 2 correct answers).

Grade A	Grade B	Grade C
0.917	1.1	0.63
0.68	0.173	4.17
1.74	0.24	0.6
0.3	0.67	0.84
0.33	6.94	0.22
4.13		

A. With 95% confidence, we cannot conclude if the samples are from three Normal Distributions
B. With greater than 95% confidence, we conclude the samples are from Non-normal Distributions
C. If we wanted to compare the Central Tendencies of these three samples we would use the one way ANOVA test
D. If we wanted to compare the Central Tendencies of these three samples we could use Mood's Median test
E. If we wanted to compare the Central Tendencies of all three samples we could use the Mann- Whitney test

Correct Answer: BD
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 138
Following process modifications, the Null Hypothesis states that no improvement to the process has occurred. If we discover the Null Hypothesis Test was rejected when it was false that would be a(n) _____.

A. Type I Error
B. Type II Error
C. Type III Error
D. Alpha Error

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 139
If the results from a Hypothesis Test are located in the "Region of Doubt" area, what can be concluded?

A. Rejection of the Alpha
B. We fail to reject the Null Hypothesis
C. The test was conducted improperly
D. We reject the Null Hypothesis

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 140
When conducting a Hypothesis Test using Continuous Data the proper sample size is influenced only by the extent to which we need to assess a Difference to be detected but not the inherent variation in the process.

A. True
B. False

Correct Answer: B

Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 141
Statistical Difference is the magnitude of difference or change required to distinguish between a true difference, brought about by change or improvement, and one that could have occurred by chance.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 142
To be an effective Lean Six Sigma practitioner one must understand the difference between _____.

A. ANOVA and the Analysis of Variance
B. Nonparametric tests and tests of Non-normal Data
C. Practical and Statistical significance
D. F-test and test of variances of 2 samples

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 143
The validity of the decision made with Hypothesis Testing is dependent upon all of the following except _____.

A. Beta risk
B. Range of data
C. Alpha risk

D. Sample size

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 144
To establish a sample size that will allow the proper overlap of distributions we do which of these?

A. Multiply Alpha by 1.75
B. Calculate one minus Beta
C. Calculate Beta plus 2
D. Multiply Beta by 3

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 145
From the variance F-test shown above, which of these conclusions is/are valid?

A. The variance between the class score distribution is not significantly different
B. This test applies only to Normal Distributed data at 99 % confidence
C. The variance between the class score distribution is significantly different
D. There are not enough data points to make any statistical conclusions

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 146
Time is always the metric on the horizontal scale of a(n) _____ Chart.

A. Pareto
B. Xbar
C. Multi-Vari
D. NP

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 147
On a _____ one can see a pattern from the graphed points such that conclusions can be drawn about the largest family of Variation.

A. Multi-Vari Chart
B. Weighted Scale
C. X-Y Matrix
D. Poisson Chart

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 148
For a batch manufacturing process, while assessing short term process variation, which variation category(ies) should one need to focus on? (Note: There are 2 correct answers).

A. Variation within consecutive pieces
B. Variation among consecutive batches
C. Variation among groups of pieces
D. Variation among the completed product

Correct Answer: AB
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 149
When the Inputs, X's, for your process are Normally Distributed about the Mean, the Outputs, Y's, will be Normally Distributed.

A. True
B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 150
Some of the sources for different types of error that can be quantified using Statistical Analysis are which of these?

A. Error in sampling
B. Bias in sampling
C. Error in measurement
D. All of the above

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 151
For a Normal Distribution as samples size increases the Range in Mean and Standard Deviation decrease relative to the Mean and Standard Deviation of the population.

A. True
B. False

Correct Answer: A
Section: (none)

Explanation

Explanation/Reference:
Explanation:

QUESTION 152
From this list select the best example of Bias in Sampling.

A. Testing the completeness of cooking a cake but the testers cannot agree on how to measure internal temperature
B. Testing the sharpness of a razor blade while the sample of 500 are from the same model razor
C. Testing the weight of participants at a wrestling event and only measuring those who finished second or better
D. Testing a hand-held GPS models for durability using samples only from Nokia Model P120

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 153
The Central Limit Theorem says that as the sample size becomes large the sample Mean distribution will form a Normal Distribution, _____.

A. If the Measurement System is properly calibrated
B. When the data is collected accurately
C. If the shape is evenly spread
D. No matter what the shape of the population distribution of individuals

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 154
A statistical test or Hypothesis Test is performed to reject or fail to reject a stated hypothesis and it converts the Practical Problem into a Statistical Problem.

A. True

B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 155
The class score distribution of schools in a metropolitan area is shown here along with an analysis output. Comment on the statistical significance between the Means of the two distributions. Select the most appropriate statement.

Histogram of Public_School, Private_School
Normal
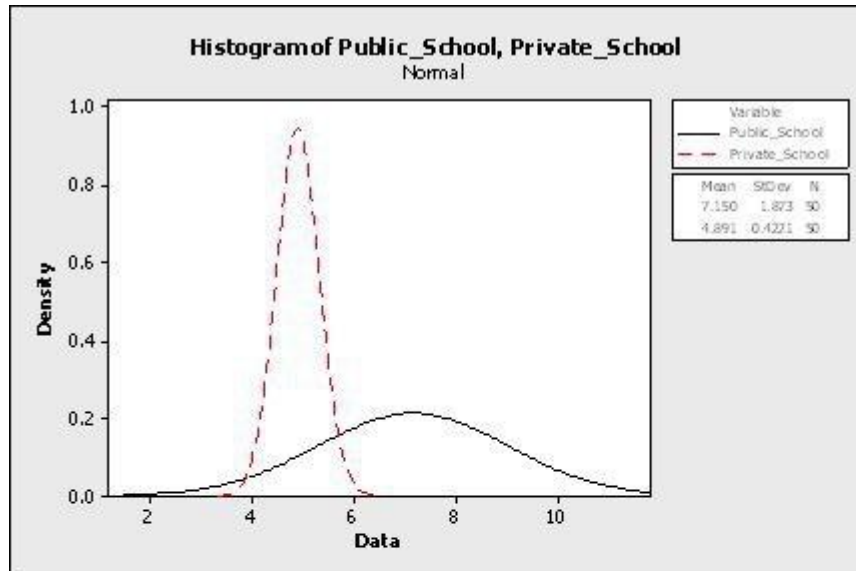
Two-sample t for Private_School vs Public_School

	N	Mean	StDev	SE Mean
Private_School	50	4.891	0.422	0.060
Public_School	50	7.15	1.87	0.26

Difference = mu (Private_School) - mu (Public_School)
Estimate for difference: -2.259
99% CI for difference: (-2.985, -1.534)
T-Test of difference = 0 (vs not =): T-Value = -8.32 p-Value = 0.000 DF = 53

A. The two class Means are statistically different from each other
B. The two class Means statistically not different from each other
C. Inadequate information on class Means to make any statistical conclusions
D. A visual comparison shows that class Means are not statistically different

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 156
An operator is measuring the distance between two points. Which is most likely to be influenced by the operator?

A. Precision of the measurement
B. Accuracy of the measurement
C. Calibration of the instrument
D. All of these answers are correct

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 157
Accuracy can be assessed in several ways and a fairly accurate means of measurement is visual comparison.

A. True
B. False

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 158
With Measurement System Analysis we are concerned with two issues that impact the potential variability of the data. They are _____.

A. Precision and Accuracy
B. Reliability and Repeatability
C. Error and Spread
D. Sensitivity and Deflection

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 159
Measurement _____ is defined as the difference between the observed and the expected values for a given set of data.

A. Bias
B. Linearity
C. Range
D. Breadth

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 160
Cost of Poor Quality (COPQ) can be classified as Visible Costs and Hidden Costs. Which of these items is a Visible Cost?

A. Lost Customer Loyalty
B. Time Value of Money
C. Returns
D. Late Delivery

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 161
A Belt has determined that the inventory of repair parts at a rework station can be reduced by 45%. According to Cost of Poor Quality (COPQ) definitions inventory reduction would be considered _____.

A. Soft Savings
B. COPQ efficiency
C. Median Savings
D. Hard Savings

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 162
When one speaks of 20% of something contributing 80% of the affect they are referring to what is known as the _____.

A. Shewhart Example
B. Connection Principle
C. Balance Equation
D. Pareto Principle

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 163
Using this data calculate the percentage of DPU.
Data: 763 defects, 18,000 units.

A. 2.12
B. 3.42
C. 4.24
D. 5.72

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 164
Calculate the Rolled Throughput Yield of this process using this data. Data: unit input: 1215, unit output: 1180, defects repaired: 184, scrap: 42

A. 80.85%
B. 81.40%
C. 82.23%
D. 84.96%

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 165
"A calculated time frame that matches customer demand" is a definition of what Lean Principles term?

A. Value Stream
B. Kaizen event
C. Takt time
D. Kanban

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 166
Which of these are examples of business metrics or Key Performance Indicators commonly referred to as KPI's?

A. Cycle Time
B. Defects
C. No. of Units Reworked

D. Labor Hours

E. All of these answers are correct

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 167
As a means of measuring the effects on other areas of a process as a result of changes in the primary metric we also define and track
_____.

A. Parallel process metrics

B. Secondary metrics

C. Tertiary metrics

D. Industry standards

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 168
What dollar amount of savings would a project show if it reduced your outstanding Accounts Receivable by $0.9 million dollars to $3.5 million total and your organization's marginal cost of capital was 5.7%?

A. $49,250

B. $51,300

C. $117,500

D. $202,424

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:

Explanation:

QUESTION 169
Handling of warranty returns, process improvement team meetings and rework to meet customer expectations are all examples of business costs that are classified as _____ .

A. Nuisance
B. Non-value Add
C. Necessary
D. Unavoidable

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 170
The Japanese born function of a Kaizen event utilizes a specific, step-by-step approach meant to bring about major changes to a process.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 171
The primary objective in removal of waste is to improve the Order Production Cycle where the time from _____ to the time of receipt of payment is compressed.

A. Shift start
B. Product development
C. Receipt of an order
D. New fiscal year

Correct Answer: C

Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 172
A Belt rearranged the location of the parts inventory for a rework station locating the most often used parts to be within hand reach of the repair person. This rearrangement resulted in quicker repair times by eliminating one of seven major elements of waste which is the Waste of _____.

A. Motion
B. Conveyance
C. Inventory
D. Waiting

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 173
Which Element of Waste best describes "the unnecessary movement of materials and goods"?

A. Overprocessing
B. Inventory
C. Motion
D. Conveyance

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 174
The Waste of Overproduction is defined as _____.

A. The unnecessary movement of people and equipment

B. The liability of materials that are bought, invested in and not immediately sold or used

C. Producing more than the next step needs or more than the customer buys

D. The extra movement of material

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 175
The English words used for the 5S's are _____ , _____ , Shining, Standardizing and Sustaining. (Note: There are 2 correct answers).

A. Shaping

B. Sorting

C. Shifting

D. Straightening

Correct Answer: BD
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 176
During the _____ phase of 5S is when we might implement a Red Tag program.

A. Straightening

B. Standardizing

C. Shining

D. Sorting

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 177
In a Fishbone Diagram the 6M's stand for Methods, Measurements, Machine, Man, Mother Nature and _____ .

A. Management
B. Merger
C. Materials
D. Medical

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 178
Which one of these tools is frequently used to help drill down to possible causes once a Fishbone Diagram is constructed?

A. 3 When Analysis
B. 5 Why Analysis
C. Ishikawa Diagram
D. Skeleton Diagnostic

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 179
Two of the key deliverables for the Measure Phase are a robust description of the process and its flow and an assessment of the Measurement System.

A. True
B. False

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:

QUESTION 180
A valuable tool to use during the Measure Phase to show material and information flow throughout an entire process is the _____ .

A. Value Stream Map
B. FMEA
C. Pareto Chart
D. Standard Operating Procedure

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation: