IASSC Lean Six Sigma - Black Belt

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

Answer(s): B

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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

Answer(s): D

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3. Common and _____Cause Variation are the focus of Statistical Process Control.

A. Uncommon

B. Ordinary

C. Special

D. Selective

Answer(s): C

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4. Special Cause Variation falls into which two categories?

A. Natural & Unnatural

B. Short Term & Long Term

C. Assignable & Pattern

D. Attribute & Discreet

Answer(s): C

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5. 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

Answer(s): B

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6. 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

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7. 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

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8. 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

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9. 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

Answer(s): D

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

Cube Plot (data means) for Tool Age
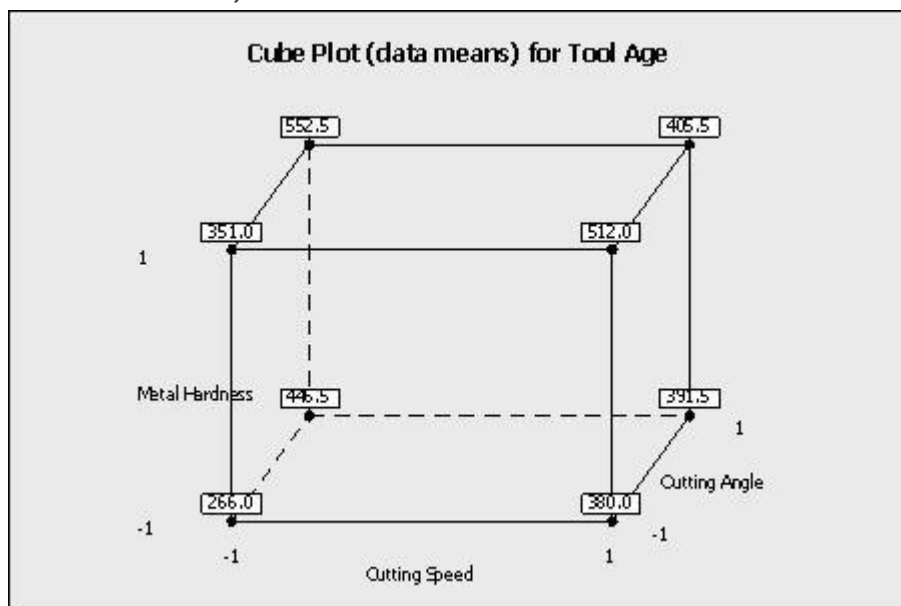
☐ A. When the cutting speed increased from low to high level, the tool age increases

☐ 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

Answer(s): A B C

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11. 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

Answer(s): B

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12. If an experiment has 5 factors and no replicates for a 2-level Experimental Design with 16 experimental runs which statement is incorrect?
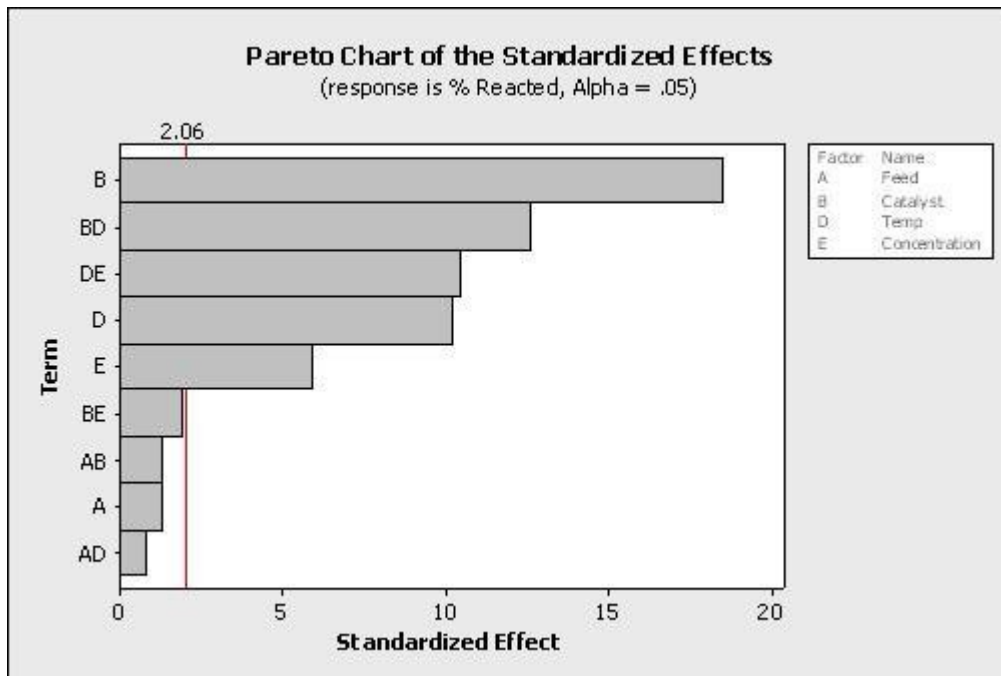
A. The Experimental Design is half-fractional

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

Answer(s): C

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13. 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

Answer(s): A C

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14. 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

Answer(s): D

15. 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

Answer(s): C

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16. 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

Answer(s): A

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17. The Lean toolbox includes all of these items except _____.

A. Mistake Proofing

B. Visual Factory

C. Design of Experiments

D. Inventory Management

Answer(s): C

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18. 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?

Answer(s): D

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19. 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

Answer(s): A

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

A. True

B. False

Answer(s): B