Exam Questions CSSBB

Certified Six Sigma Black Belt

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NEW QUESTION 1
- (Topic 1)
Calculate the interaction effect

Run #	A	B	Ave. Response
1	–	–	129
2	–	+	133
3	+	–	86
4	+	+	80

A. 1.5
B. 205
C. –5
D. 17
E. –17

Answer: C

NEW QUESTION 2
- (Topic 1)
Samples of size n=36 are randomly selected from a population with mean = 125 and variance 12. Find the variance of the distribution of sample means.

A. .333
B. .577
C. 2
D. 3.464
E. 12

Answer: A

NEW QUESTION 3
- (Topic 1)
Causes in a cause and effect diagram often include management, measurement systems, mother nature and the four standard causes:

A. man, material, methods, machines
B. man, manufacturing, methods, material
C. marketing, methods, material, machines
D. man, material, millennium, machines
E. none of the above

Answer: A

NEW QUESTION 4
- (Topic 1)
A random sample is selected from a population of measurements. The mean of the sample is not equal to the mean of the population. This is due to:

A. Type I error
B. Type II error
C. sampling error
D. the population is not normal
E. measurements were not exact

Answer: C

NEW QUESTION 5
- (Topic 1)
In a series of linked processes and associated feedback loops the product or service flows _____ and the information flows _____ .

A. rapidly, slower
B. downstream, upstream
C. evenly, digitally
D. sooner, later
E. to the customer, from the supplier
F. none of the above

Answer: B

NEW QUESTION 6
- (Topic 1)

	size			
	.500	.625	.750	.875
Nut	146	300	74	41
Washer	280	276	29	32
Bolt	160	214	85	55

This table displays the inventory of fasteners in a storage cabinet. An item is selected at random from the fastener cabinet. Find the approximate probability it is a 1/2 inch bolt.

A. .65
B. .30
C. .09
D. .35
E. none of the above

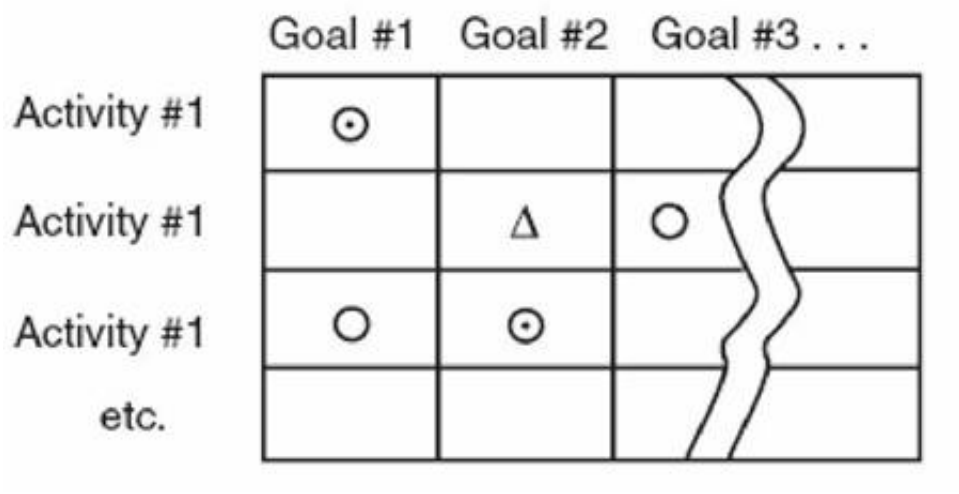
Answer: C

NEW QUESTION 7
- (Topic 1)
A higher resolution number for an experimental design indicates that:

A. results are more clear
B. confounding between main effects and interaction effects are less likely to be significant
C. a higher number of replications have been used
D. all factors have been tested at all levels
E. the design is more balanced

Answer: B

NEW QUESTION 8
- (Topic 1)
A management team lists nine goals across the top of a rectangle and 15 activity initiatives along the left hand side of the rectangle. If one of the activities strongly supports one of the goals a circle is placed in the box where that activity's row intersects the goal's column. If the activity's support is very strong a "bulls eye" is placed in the box and if the support is weak a triangle is used. This best describes which problem solving tool?



A. Affinity diagram
B. Inter-relationship digraph
C. Tree diagram
D. Process decision program chart
E. Matrix diagram
F. Prioritization matrix
G. Activity network diagram

Answer: E

NEW QUESTION 9
- (Topic 1)
Find the value of (1) in the ANOVA table. Assume:

$\alpha = 0.10$:

ANOVA Table

Source	SS	df	MS	F ratio	F crit	P-value
x	1.48	1	(1)	(2)	(3)	(4)
Y	18.6	1	(5)	(6)	(7)	(8)
xxY	12.2	1	(9)	(10)	(11)	(12)
Error	2.1	4	(13)			

A. 16.4
B. 3.2
C. 18.6
D. 23.2
E. 4.54
F. 12.2
G. 0.525
H. 2.82
I. 1.48
J. 35.4
K. 0.10<P<1
L. 0.05<P<0.10
M. 0.01<P<0.05
N. 0.005<P<0.01
O. 0<P<0.005

Answer: I

NEW QUESTION 10
- (Topic 1)
A population of size 1,000,000 has mean 42 and standard deviation 6. Sixty random samples, each of size 15 are selected. According to the Central Limit Theorem the distribution of the sixty sample means has a standard deviation of approximately:

A. 6
B. 6/42
C. 6/15
D. 6/ 15
E. none of the above

Answer: D

NEW QUESTION 10
- (Topic 1)
Is it safe to assume that the interaction effects are negligible?

Run #	A	B	Ave. Response
1	–	–	129
2	–	+	133
3	+	–	86
4	+	+	80

A. yes
B. no
C. probably

Answer: C

NEW QUESTION 11
- (Topic 1)
The principle disadvantage of fractional factorial experiments is that:

A. experimental error is high
B. robustness is compromised
C. effects are confounded
D. measurements are less precise

E. analysis is more difficult

Answer: C

NEW QUESTION 16
- (Topic 1)
The team in the above problem draws arrows from Post-It® notes that are causes to notes that are the effects of these causes. This step is best described by which approach to problem solving?

A. Affinity diagram
B. Inter-relationship digraph
C. Tree diagram
D. Process decision program chart
E. Matrix diagram
F. Prioritization matrix
G. Activity network diagram

Answer: B

NEW QUESTION 18
- (Topic 1)
This table displays the inventory of fasteners in a storage cabinet. An item is selected at random from the fastener cabinet. Find the approximate probability it is size 3/4.

	size			
	.500	.625	.750	.875
Nut	146	300	74	41
Washer	280	276	29	32
Bolt	160	214	85	55

A. .85
B. .185
C. .03
D. .11
E. none of the above

Answer: D

NEW QUESTION 23
- (Topic 1)
This table displays the inventory of fasteners in a storage cabinet. An item is selected at random from the fastener cabinet. Find the approximate probability it is a bolt.

	size			
	.500	.625	.750	.875
Nut	146	300	74	41
Washer	280	276	29	32
Bolt	160	214	85	55

A. 160
B. .160
C. .09
D. .30
E. none of the above

Answer: D

NEW QUESTION 27
- (Topic 1)
The quality leader responsible for the term Total Quality Management (TQM):

A. Juran
B. Ishikawa
C. Crosby
D. Feigenbaum
E. Taguchi
F. none of the above

Answer: D

NEW QUESTION 29
- (Topic 1)
Find the value of (4) in the ANOVA table. Assume:

$$\alpha = 0.10$$

ANOVA Table

Source	SS	df	MS	F ratio	F crit	P-value
x	1.48	1	(1)	(2)	(3)	(4)
Y	18.6	1	(5)	(6)	(7)	(8)
xxY	12.2	1	(9)	(10)	(11)	(12)
Error	2.1	4	(13)			

A. 16.4
B. 3.2
C. 18.6
D. 23.2
E. 4.54
F. 12.2
G. 0.525
H. 2.82
I. 1.48
J. 35.4
K. 0.10<P<1
L. 0.05<P<0.10
M. 0.01<P<0.05
N. 0.005<P<0.01
O. 0<P<0.005

Answer: K

NEW QUESTION 31
- (Topic 1)
Calculate the main effect of factor A (i. e. A+ – A–).

Run #	A	B	Ave. Response
1	–	–	129
2	–	+	133
3	+	–	86
4	+	+	80

A. 46
B. 129
C. 83
D. –46
E. none of the above

Answer: E

NEW QUESTION 32
- (Topic 1)
= 0.05 A machine tool vender wants to sell an injection molding machine. The current machine produces 3.2% defectives. A sample of 1100 from the vender 's machine has 2.9% defective. Do these numbers indicate that the proposed machine has a lower rate of defectives?

A. yes
B. no

Answer: A

NEW QUESTION 34
- (Topic 1)
If the probability that event A occurs is 0.51, the probability that event B occurs is 0.64 and that probability that both A and B occur is 0.23 then:

A. events A and B are complementary
B. events A and B are mutually exclusive
C. events A and B are supplementary
D. events A and B are not mutually exclusive
E. events A and B are statistically independent

Answer: D

NEW QUESTION 37
- (Topic 1)
= 0.05 The average weight of castings produced at the Nebraska foundry is 3.7 lbs. A new supplier from Kansas has submitted a batch of castings known to have normally distributed weights. A random sample of 10 has an average weight of 3.6 lbs. and standard deviation 0.06 lbs. Do these data indicate that the Kansas foundry produce lighter castings on average?

A. yes
B. no

Answer: A

NEW QUESTION 39
- (Topic 1)
A medicine with efficacy of .52 is given to five patients. Find the approximate probability that at least one of the patients is cured. (Hint: Use the binomial formula.)

A. .975
B. .480
C. .531
D. .416
E. none of the above

Answer: A

NEW QUESTION 44
- (Topic 1)
The Toronto plant produces appliances in the following distribution: Type A 23% Type B 42% Type C 35% A random sample of 300 appliances from the Texas plant has the following distribution: Type A 73 Type B 111 Type C 116 Is the distribution of appliances at the Texas plant the same as that at the Toronto plant?

A. yes
B. no

Answer: B

NEW QUESTION 49
- (Topic 1)
A _____ from a sample is used to estimate a population _____. The two words that best fill these blanks are:

A. item, value
B. value, statistic
C. statistic, parameter
D. parameter, value
E. parameter, statistic

Answer: C

NEW QUESTION 54
- (Topic 1)
The primary metric for a project is reduced cost for process A .A consequential metric could be:

A. reduced cycle time
B. reduced scrap rate
C. reduced set-up time
D. all the above
E. none of the above

Answer: D

NEW QUESTION 56
- (Topic 1)
According to the Central Limit Theorem:

A. the median and the mean have the same value in a symmetric distribution
B. the mode of a normal distribution is also the mean
C. the mean of an exponential distribution is smaller than the median
D. the mean, median and mode of a normal distribution all have the same value
E. none of the above

Answer: E

NEW QUESTION 61
- (Topic 1)
P(A) = .42, P(B) = .58 P(A&B) = .10. Are A and B mutually exclusive (or disjoint)?

A. yes
B. no

Answer: B

NEW QUESTION 66
- (Topic 1)
The term “expected value” is closest to the term:

A. median
B. probabilistic model
C. mean
D. Markov value
E. regressive value

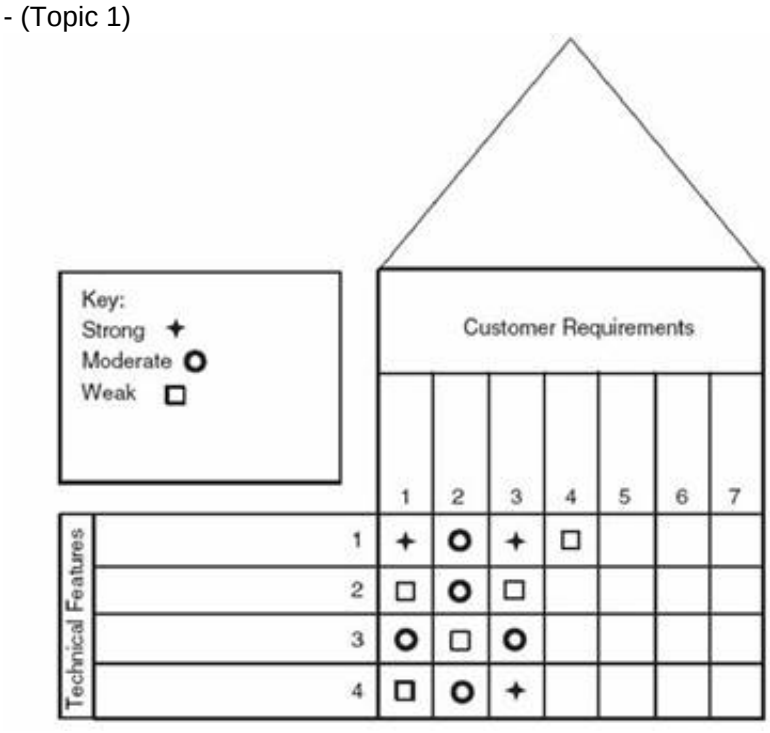
Answer: C

NEW QUESTION 67
- (Topic 1)
= 0.05 In problem 1, do the data indicate that the population for machine A has a larger standard deviation?

A. yes
B. no

Answer: B

NEW QUESTION 70
- (Topic 1)



This is an example of part of a:

A. QFD Matrix
B. Activity Network Diagram
C. Interrelationship Diagram
D. Affinity Diagram

Answer: A

NEW QUESTION 75

- (Topic 1)
A project that lacks a clear definition of its scope and boundaries runs the risk of:

A. straying from the intended path
B. trying to solve unrelated problems
C. having difficulty in collecting baseline data
D. suffering morale problems
E. all the above
F. none of the above

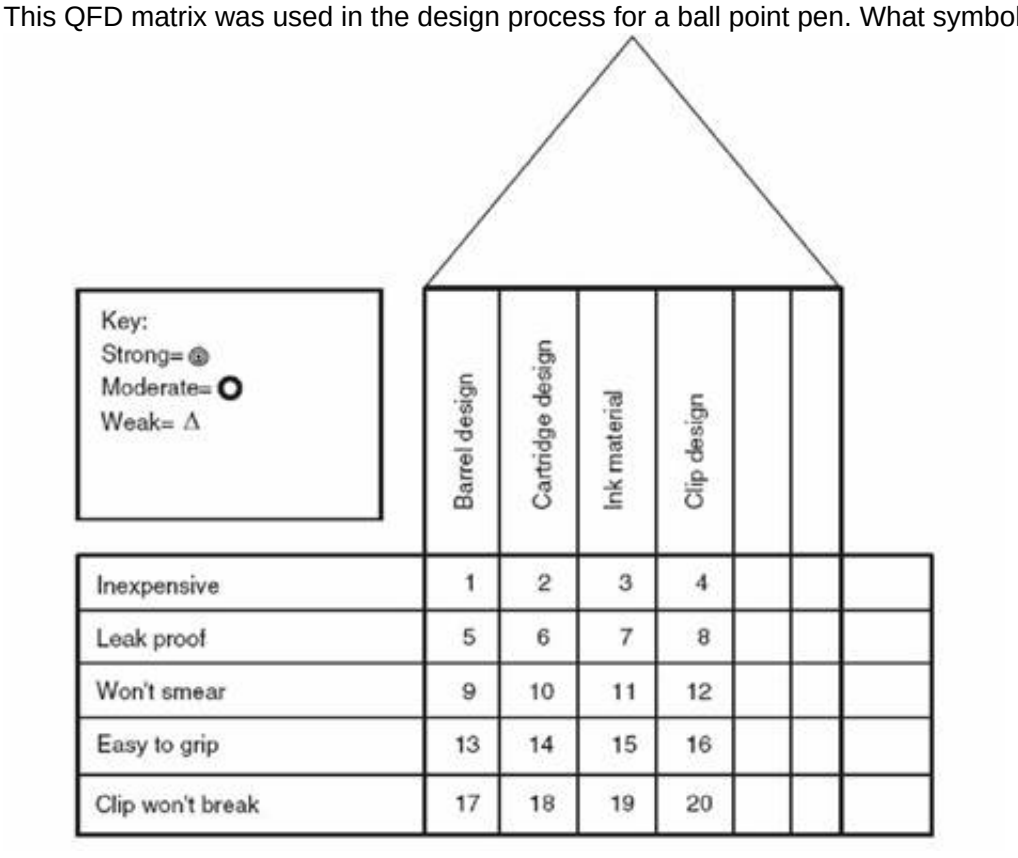
Answer: E

NEW QUESTION 78
- (Topic 2)
Use the reliability formula from the previous problem to find the reliability at MTBF.

A. 0.94
B. 0.78
C. 0.37
D. 0.26
E. none of the above

Answer: C

NEW QUESTION 82
- (Topic 2)
This QFD matrix was used in the design process for a ball point pen. What symbol is appropriate for the square labeled 11?



A.
B.
C.

A. none of the above

Answer: B

NEW QUESTION 87
- (Topic 2)
An x-bar and R chart has four part measurements per sample The control limits on the averages chart are 2.996 and 3.256. Assume the process data form a normal distribution. What is the probability that the next part measurement falls outside the control limits?

A. 0.00135
B. 0.0027
C. 0.0681
D. 0.1362
E. 0.2724
F. none of the above

Answer: D

NEW QUESTION 92
- (Topic 2)
Calculate the estimated variance of the population from which the following values have been randomly selected: 2.8 2.7 2.6 2.9 2.8 2.8 2.8:

A. .095
B. .009

C. .088
D. .008

Answer: A

Explanation:

The variance formula will be used for calculating the estimated variance of the given data. The formula is:
N = 7
$\bar{x}$
= 2.77
__(x-
)2

NEW QUESTION 95
- (Topic 2)
A correct statement about the relationship between the terms parameter and statistic is:

A. a population statistic is more accurate than a parameter
B. a sample parameter is used to estimate a statistic
C. a sample statistic is used to estimate a population parameter
D. standard deviation calculations requires both statistics and parameters

Answer: C

NEW QUESTION 98
- (Topic 2)
What percent of population falls below the lower specification limits?

A. 9.18%
B. 22.66%
C. 6.68 %
D. 1.83%

Answer: A

NEW QUESTION 101
- (Topic 2)
A process shows the following number of defects. Each sample size for this process is 85. 3 8 2 7 7 6 8 8 9 5 Find the control limits.

A. none and 13.8
B. 12.6 and 25.2
C. none and 25.2
D. none of the above

Answer: A

NEW QUESTION 106
- (Topic 2)
A meeting is called for all three shifts to determine the settings to be used on machine #45. This is an example of:

A. visual factory
B. kanban
C. poka-yoke
D. standard work
E. set up time reduction (SMED)

Answer: D

NEW QUESTION 108
- (Topic 2)
Find the value of (12) in the ANOVA table. Assume:

$\alpha = 0.10$

ANOVA Table

Source	SS	df	MS	F ratio	F crit	P-value
x	1.48	1	(1)	(2)	(3)	(4)
Y	18.6	1	(5)	(6)	(7)	(8)
xxY	12.2	1	(9)	(10)	(11)	(12)
Error	2.1	4	(13)			

A. 16.4
B. 3.2

C. 18.6
D. 23.2
E. 4.54
F. 12.2
G. 0.525
H. 2.82
I. 1.48
J. 35.4
K. 0.10<P<1
L. 0.05<P<0.10
M. 0.01<P<0.05
N. 0.005<P<0.01
O. 0<P<0.005

Answer: N

NEW QUESTION 111
- (Topic 2)
A process shows the following number of defectives. Each sample size for this process is 85.3 8 2 7 7 6 8 8 9 5 Find the control limits.

A. none and 13.5
B. 12.6 and 25.2
C. none and 25.2
D. none of the above

Answer: A

NEW QUESTION 112
- (Topic 2)
A process using a p-chart has pbar = 0.076 and nbar = 4.86. Find the control limits.

A. 0.069 and 0.083
B. 0.072 and 0.080
C. 0.040 and 0.112
D. 0.0756 and 0.0764
E. none of the above

Answer: C

NEW QUESTION 115
- (Topic 2)
An full factorial experiment has three factors. Each factor has three levels. The number of test combinations or runs is:

A. 9
B. 6
C. 27
D. 36
E. 33

Answer: C

NEW QUESTION 120
- (Topic 2)
Quality Function Deployment is a tool to aid in:

A. analyzing non-paired data
B. determining if quality procedures being followed on the shop floor
C. ascertaining which processes are functioning correctly
D. linking customer requirements to product features
E. all of the above
F. none of the above

Answer: D

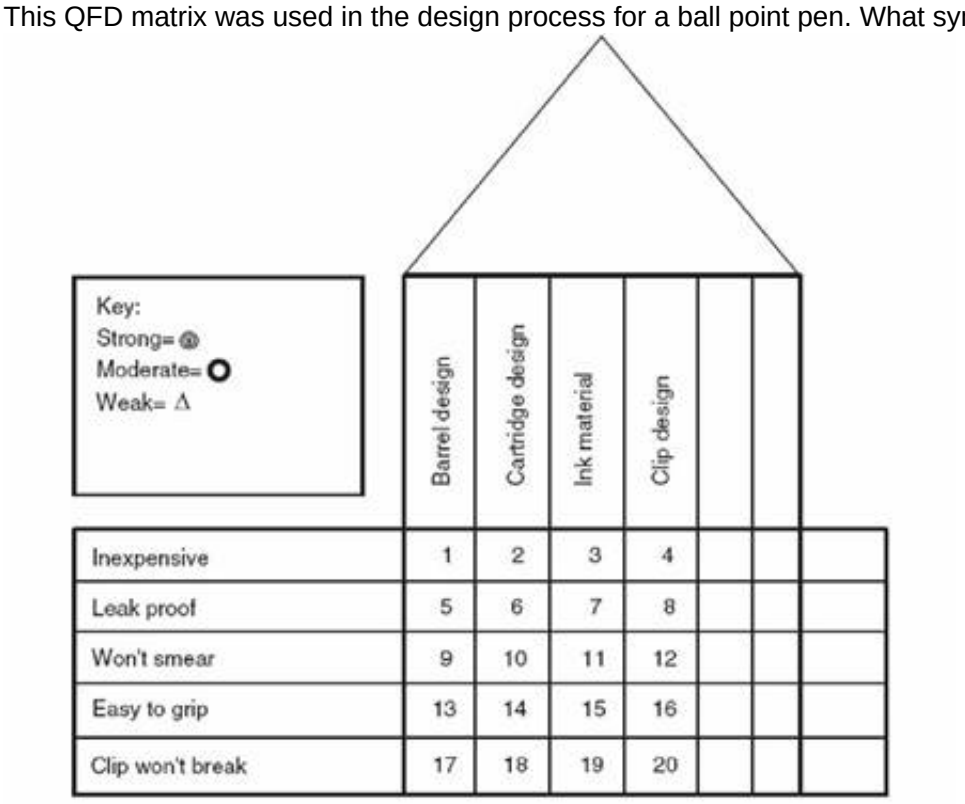
NEW QUESTION 125
- (Topic 2)
An x-bar and R chart is used to monitor a process. One week ago a new type of raw material was introduced and since that time 60 points have been plotted on the xbar chart and all are in the middle third of the chart. The corresponding 60 points on the R chart are all below the average range. This indicates that:

A. the operator has been plotting the points incorrectly
B. it is time to recalibrate the gage used
C. it is time to recalculate the control limits
D. the material manager should be asked to go back to the previous raw material so thecharts will more accurately reflect the process

Answer: C

NEW QUESTION 127

- (Topic 2)
This QFD matrix was used in the design process for a ball point pen. What symbol is appropriate for the square labeled 5?



A.
B.
C.

A. none of the above

Answer: A

NEW QUESTION 129
- (Topic 2)
A set of data from a process has 8 readings per sample and 50 samples. The mean of the 50 sample means is 12.62. The mean of the 50 ranges is 0.18. Find the control limits for the xbar chart.

A. 12.55 and 12.69
B. 12.11 and 13.13
C. 12.54 and 12.70
D. none of the above

Answer: A

Explanation:

This formula is using control limit for the x bar chart

$$UCL_{\overline{X}} = \overline{\overline{X}} + A_2\overline{R}$$

= 12.62 + (0.373)(0.18)
= 12.62 + 0.06714
= 12.69

$$LCL_{\overline{X}} = \overline{\overline{X}} - A_2\overline{R}$$

=12.62 – (0.373)(0.18)
=12.62 – 0.06714
= 12.55
UCL is 12.69 and LCL is 12.55

n	A_2	n	A_2	n	A_2
2	1.880	7	0.419	12	0.266
3	1.023	8	0.373	13	0.249
4	0.729	9	0.337	14	0.235
5	0.577	10	0.308	15	0.223
6	0.483	11	0.285		

NEW QUESTION 130
- (Topic 2)
A and B are events. P(A) = 0.80 and P(B) = 0.90.

A. events A and B are disjoint or mutually exclusive
B. events A and B are not disjoint or mutually exclusive

C. P(A and B) = 0
D. P(A and B) = 1.7

Answer: B

NEW QUESTION 134
- (Topic 2)
In the theory of constraints the “subordinate” step refers to:

A. a listing of sub-processes
B. reducing the rate for some processes
C. the portion of the process flow chart that depends on the main flow
D. the less important product or service stream
E. none of the above

Answer: B

NEW QUESTION 139
- (Topic 2)
A team wants to make a schedule for a project showing which tasks must be done sequentially and which may be done simultaneously. Which tool is most appropriate?

A. matrix diagram
B. cause and effect diagram
C. process decision program chart
D. affinity diagram
E. activity network diagram
F. tree diagram
G. prioritization matrix
H. matrix diagram
I. interrelationship digraph

Answer: E

NEW QUESTION 142
- (Topic 2)
Dr. W. Edwards Deming:

A. lectured in Japan after World War II
B. was an author of several books in the US
C. lectured widely in the US
D. is considered an expert in the quality field
E. all of the above
F. none of the above

Answer: E

NEW QUESTION 146
- (Topic 2)
If the value of the test statistic had been 0.185, what action should have been taken regarding the null hypothesis?

A. rejected
B. accepted
C. none of the above
D. all of the above

Answer: C

NEW QUESTION 147
- (Topic 2)
Find the average difference dbar.

Document #	Time Reqd, sec	
	Ptr #1	Ptr#2
1	4.2	3.9
2	5.6	5.5
3	2.8	2.9
4	7.1	6.7
5	11.5	11.0
6	8.2	8.1
7	12.3	11.8
8	13.5	13.0

A. 0.2875
B. 0.3502
C. 0.2714
D. 0.2295

Answer: A

NEW QUESTION 151
- (Topic 2)
If it is desirable to maximize the response R, the following levels should be used:

A. A+ and B+
B. A+ and B–
C. A– and B+
D. A– and B–
E. none of the above

Answer: A

NEW QUESTION 156
- (Topic 2)
The mean, median and mode of a distribution have the same value. What can be said about the distribution:

A. it is exponential
B. it is normal
C. it is uniform
D. none of the above

Answer: D

NEW QUESTION 161
- (Topic 2)
What is the value of the test statistic?

A. 0.898
B. 1.251
C. 0.429
D. 3.57
E. none of the above

Answer: E

Explanation:
As per reference to the given table in the URL, the 0.05 at 6 is 2.447. Hence none of the answers are correct.
Reference: http://www.medcalc.org/manual/t-distribution.php

NEW QUESTION 163
- (Topic 2)
In an experimental design context, replication refers to:

A. duplicating experimental results at another location
B. repeating a test with the same factor levels
C. obtaining the same or similar results from different factors
D. repeating an experiment but using at least one different factor level

Answer: C

NEW QUESTION 166

- (Topic 2)
If item A is more likely to be detected than item B which will have the highest Severity value?

A. item A
B. item B
C. cannot be determined

Answer: C

NEW QUESTION 169
- (Topic 2)
A helpful time to use a Quality Function Deployment matrix is:

A. while planning for a new or redesigned process
B. while planning for new or redesigned parts
C. while planning for a new or redesigned product
D. all of the above
E. none of the above

Answer: D

NEW QUESTION 174
- (Topic 2)
An experiment is conducted by checking the effect that three different pressures have on the surface appearance of a product. Ten items are produced at each of the three pressures. The number of replications, factors and levels are:

A. 10, 3, 2
B. 10, 2, 3
C. 2, 3, 3
D. 10, 1, 3
E. 10, 3, 1

Answer: D

NEW QUESTION 177
- (Topic 2)
A frequent cause of system sub optimization is:

A. optimizing individual processes
B. failing to draw a system flow chart
C. using data with outliers
D. failing to consider the normal distribution

Answer: A

NEW QUESTION 178
- (Topic 2)
A process shows the following number of defectives. Each sample size for this process is 85.3 8 2 7 7 6 8 8 9 5
What control chart should be used?

A. x-bar and R
B. median
C. individual and moving range
D. p
E. np
F. c
G. u
H. none of the above

Answer: E

NEW QUESTION 182
- (Topic 2)
A robust design is one which:

A. has high reliability
B. has low maintenance frequency
C. is simple to manufacture
D. is resistant to varying environmental conditions

Answer: D

NEW QUESTION 186
- (Topic 2)
A team has been asked to reduce the occurrence of a particular defect. They begin by brainstorming all possible causes using a:

A. matrix diagram

B. cause and effect diagram
C. process decision program chart
D. affinity diagram
E. activity network diagram
F. tree diagram
G. prioritization matrix
H. matrix diagram
I. interrelationship digraph

Answer: B

NEW QUESTION 190
- (Topic 2)
An x-bar and R chart has four part measurements per sample The control limits on the averages chart are 2.996 and 3.256. Assume the process data form a normal distribution.What is the probability that the next plotted point falls outside the control limits?

A. 0.00135
B. 0.0027
C. 0.0054
D. none of the above

Answer: B

NEW QUESTION 191
- (Topic 2)
A principle advantage of fractional factorial experimental designs is:

A. reduced cost
B. improved accuracy
C. increased confounding
D. higher confidence level
E. reduced probability of type II errors

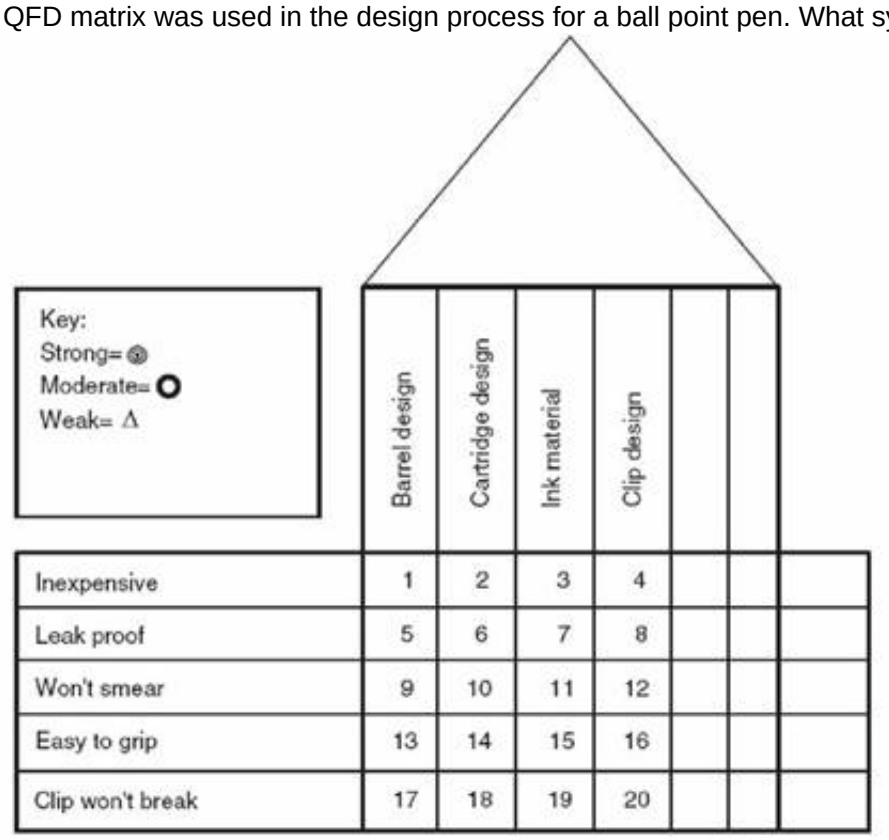
Answer: A

NEW QUESTION 195
- (Topic 2)
The average number of defects is 21.6. Find the upper control limit for the c-chart.

A. 26.4
B. 24.6
C. 18.8
D. 26.2
E. none of the above

Answer: E

NEW QUESTION 196
- (Topic 2)
This QFD matrix was used in the design process for a ball point pen. What symbol is appropriate for the square labeled 12?



A.
B.
C.

A. none of the above

Answer: D

NEW QUESTION 198
- (Topic 2)
The following is a set of individual measurements: 3 5 4 5 6 3 4 3 2 4 5 6 5 7 6 4 5 5 8 7 6 6 7 7 4
Find the control limits for the range chart.

A. none and 4.2
B. none and 5.1
C. 0.2 and 1.5
D. none of the above

Answer: A

NEW QUESTION 202
- (Topic 2)
Proposed Six Sigma projects that are not in some way linked to organizational goals:

A. will typically be short term
B. use statistical inference
C. have a high risk of failure
D. should not be approved
E. none of the above

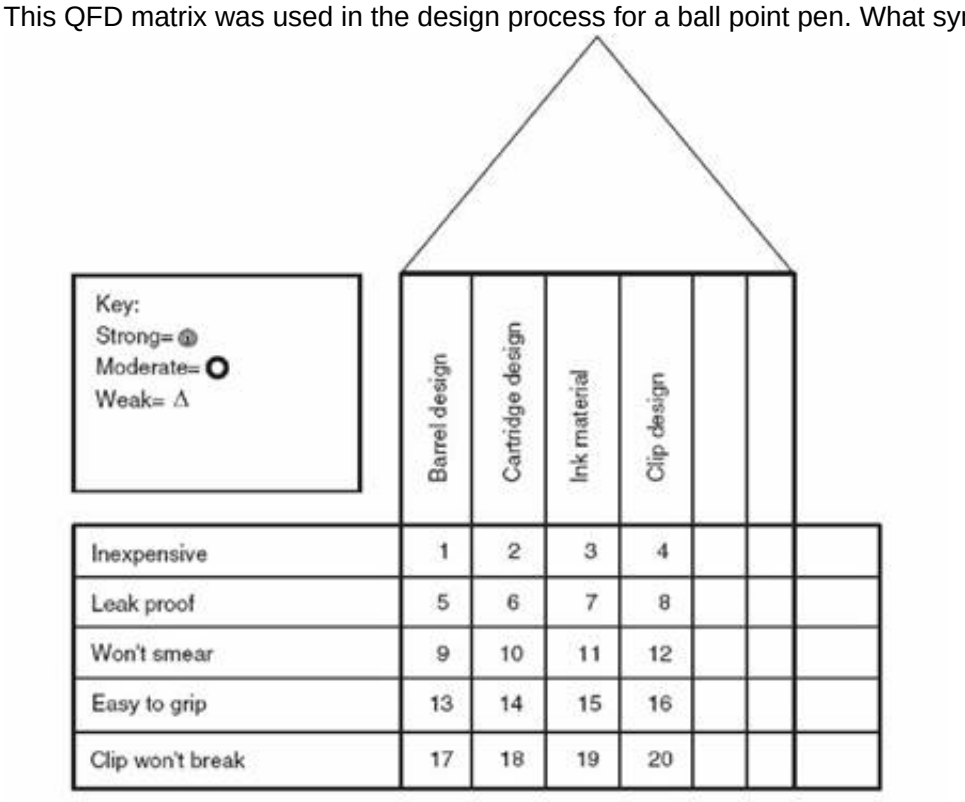
Answer: D

NEW QUESTION 204
- (Topic 2)
Find the value of m or b1:

A. 0.25
B. 0.63
C. 0.75
D. 1.22

Answer: C

NEW QUESTION 207
- (Topic 2)
This QFD matrix was used in the design process for a ball point pen. What symbol is appropriate for the square labeled 13?



A.
B.
C.

A. none of the above

Answer: B

NEW QUESTION 209
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