

**100%** Money Back  
**Guarantee**

**Vendor:** ASQ

**Exam Code:** CSSGB

**Exam Name:** Six Sigma Green Belt

**Version:** Demo

**QUESTION: 1**

The right hand side of a completed "house of quality" (HOQ) displays rankings and values for:

- A. Customer needs or desires
- B. Competitive assessments or comparisons
- C. Design feature measurements and importance
- D. Design feature interactions

**Answer: B**

The subroof of a HOQ displays design features and the roof shows design feature interactions (delimited). The "basement" of the HOQ shows target values, or design features and technical importance(c eliminated). The left side of the HOQ details key customer needs or desires (a eliminated). The right side of the HOQ shows competitive assessments and/or comparisons.

**QUESTION: 2**

Which of the following techniques has proven useful in translating customer needs into product design features?

- A. Changing perceptions
- B. Customer service principles
- C. Confrontation and problem solving
- D. Quality function deployment

**Answer: D**

Answers a and c are customer conflict resolution techniques. Answer b addresses service principles, not the question at hand. The role of quality function deployment (QFD) is to translate customer needs into design features.

**QUESTION: 3**

The SIPOC business model helps everyone in the company see the business from an overall process perspective. However, it does NOT:

- A. Provide a framework applicable to processes of all sizes
- B. Identify the few key business customers
- C. Display cross-function activities in simple terms

D. Help maintain the big business picture

**Answer: B**

Note that a negative response is requested. The odd choice out is answer B Identification of the key business customers is done by means other than a SIPOC model. The other answers a, c and d are valid.

**QUESTION: 4**

The organization's customer service program can be enhanced in many ways. One of the ways would be:

- A. Provide better procedures for customer service personnel
- B. Restrict access to customer data
- C. Have supervisors available to answer more questions
- D. Utilize employee involvement

**Answer: D**

Customer service is important to an organization. To increase its effectiveness, everyone should be involved. This would mean all employees. Better procedures (answer a) can help. Restricting access to customer data (answer b) is not good. A supervisor being available to answer more questions (answer c) is going backwards. Employee involvement places decision making at the level where the action occurs (answer d).

**QUESTION: 5**

Having extensive industry knowledge makes upper management "experts" in customer needs and desires. To win in the marketplace they should:

- A. Authorize many new products as soon as possible
- B. Start with a new marketing plan fitting customer needs
- C. Develop a strategic plan for new products
- D. Ask for help, because they often don't really know the customer

**Answer: D**

One can learn from the experiences of the 1970s U.S. automotive experts as they were being pushed around by the Japanese auto makers. The U.S. auto makers knew the American public, it was their market for 60 years. Fresh customer data is always needed. The question suggests that management knows it all and does not need any more information. Answers a,

b and c imply that a producer is going ahead with a marketing effort without customer input. Answer d is correct, because of the producer's need for more information.

**QUESTION: 6**

A customer satisfaction program was started on the right foot and has gone very well for the last year or so. The company should:

- A. Look to improve the program, with new customer input
- B. Do nothing with the program, it's not broken
- C. Form a manager's group to add new wrinkles to the program
- D. Concentrate on long term customers

**Answer: A**

Even though the customer satisfaction program has gone well for a certain time frame, one still must continue to listen to the customer. Answer b, to do nothing, would probably not keep your company competitive. Answer c, forming a manager's group, is too restrictive. It permits internal people to formulate external customer expectations. Answer d is too restrictive for a variety of reasons. Lack of growth could be one of them.

**QUESTION: 7**

A six sigma improvement team may be required to analyze customer data in order to define a project or the results of an improvement. Which of the following tools would be of LEAST value?

- A. Conflict resolution
- B. Statistical analysis
- C. Matrix diagrams
- D. Pareto analysis

**Answer: A**

Note that a negative response is requested. The techniques suggested by answers b, c and d, plus others, can be employed. Additionally, most of these tools are more effective if they are used on similar customer data, over different time periods, to ascertain if the improvement is still valid or if there are changes in the market. Answer a is a good choice for many questions but not this one.

**QUESTION: 8**

Customer expectations follow which hierarchy of needs, from low to high?

- I. Expected
- II. Basic
- III. Unanticipated
- IV. Desired

- A. II, I, IV, III
- B. III, I, II, IV
- C. IV, II, I, III
- D. I, II, III, IV

**Answer:** A

There is a hierarchy of customer expectations in regard to product or service quality. It is similar in nature to Maslow's hierarchy of needs. The hierarchy of customer expectations follow the stages of basic (II), expected (I), desired (IV) and unanticipated (III). Only answer a starts with II, and continues with the correct sequence.

**QUESTION:** 9

During the team building phase, which of the following best describes the actions of the team?

- A. The group is uncertain of their duties
- B. Members prioritize and perform tasks
- C. Member cooperation is evident
- D. The team leader usually delegates duties

**Answer:** A

This question requires some knowledge of team life cycles. Some authorities refer to the team life cycle phases as build, develop and optimize. Others use forming, storming, norming and performing. The building phase is an early one in which the leader provides more direction and the group is uncertain of their roles and duties (Answer a). During this period, the leader does not delegate responsibilities readily and the team usually does not have the skills and experience to prioritize and perform tasks without assistance.

**QUESTION:** 10

In most cases, an improvement team receives the least control and direction during which of the following stages:

- A. Building
- B. Storming
- C. Performing
- D. Alarming

**Answer:** C

The performing stage is the most mature and advanced team stage. The team leader (and/or facilitator) would provide the least control and direction because the team has demonstrated their own effective decision making capability.

**QUESTION:11**

Excessive conflict within an improvement team:

- A. Has a negative effect on team members and should be avoided
- B. Has a positive effect on creating alternate solutions
- C. Most often results in win-win situations
- D. Promotes equal participation among members

**Answer:** A

Excessive conflict within a team often has a negative effect on team members. Conflict most often results in win-lose or lose-lose situations. Rarely will either a win-win situation or creative alternate solutions result. Only a few exceptional personalities thrive in an environment of conflict.

**QUESTION: 12**

Good improvement team members will:

- A. Provide valid excuses when they miss a meeting
- B. Agree with the team even when it is wrong
- C. Encourage participation by other team members
- D. Withhold unpopular information from the team

**Answer:** C

Answers b and d might indicate a condition known as groupthink, which is to be avoided. Generally, good team members don't miss meetings and therefore, don't need excuses (a). A good team member will encourage participation by other members.

**QUESTION: 13**

Which of the following describes poorly functioning teams?

- A. Members act independently without inter-dependency
- B. Objectives are realistically set and met
- C. Team members listen to what is being said
- D. Facts and opinions are distinguished

**Answer: A**

The key question phrase is "poorly functioning." Answers b, c and d are desirable team characteristics (team members listen well and objectives are realistically set and met and facts and opinions are distinguished). Answer a is a poor characteristic in any team or group. Team members must be able to act both independent and interdependently.

**QUESTION: 14**

Effective team mechanics would typically NOT include which of the following?

- A. The development of an agenda
- B. The support of upper management
- C. The distribution of minutes
- D. The meeting time, frequency and location

**Answer: B**

The keys to this question are "mechanics" and "not include." A team must have the support of upper management (answer b). However, this is the answer to a question that is not asked. This question deals with team mechanics, which includes agendas, times, locations, minutes, etc. Answers a, c and d are all necessary team mechanics.

**QUESTION: 15**

When giving instructions to those who will perform a task, the communication process is completed:

- A. When the worker goes to his work station to do the task
- B. When the person giving the instruction has finished talking
- C. When the worker acknowledges these instructions by describing how he/she will perform the task
- D. When the worker says that he/she understands the instructions

**Answer: C**

The best communication process allows for effective feedback. The most comprehensive feedback from the four choices is answer c.

**QUESTION: 16**

Understanding, controlling and improving an organization's processes to create value for all stakeholders would be called:

- A. The SIPOC diagram
- B. Process performance metric
- C. Business process management
- D. The establishment of KPIVs and KPOVs

**Answer: C**

The question is describing business process management (BPM), answer c.. The other answers are tools and techniques that could be used to support BPM.

**QUESTION: 17**

As an alternative to QFD, the plotting of items of customer importance versus the customer's corresponding satisfaction level, using a form of Likert scale would most appropriately be called:

- A. A matrix diagram
- B. A perceptual map
- C. A cause-and-effect matrix
- D. A correlation chart

**Answer: B**

A form of matrix diagram is being described. Thus, answer d can be eliminated. There is no evidence that a cause-and-effect relationship is being considered. Therefore, answer c can be eliminated. Without specific knowledge, the choice comes down to either a or B. However, a perceptual map is a specialized matrix diagram that captures the perceptions of the customer.

**QUESTION: 18**

One would say that, from an overall perspective, the activities of a company are tied together by:

- A. Customers
- B. Stockholders
- C. Suppliers
- D. Process management

**Answer:** D

In the context of the question, almost any model or schematic of an organization has either a business process management or internal company process at its core.

**QUESTION:** 19

If a company fails to meet their quarterly projected sales and profit forecasts, which of the following stakeholder groups would be LEAST affected?

- A. Suppliers
- B. Stockholders
- C. Employees
- D. Society

**Answer:** D

Note that a negative response is requested. In today's volatile stock market, the share price could drop 10% or more if the quarterly sales or profit forecast were missed. Dependent upon how badly the numbers were missed, employees and suppliers could be affected as well. Society (particularly local society) could also be impacted but certainly to a lesser extent.

**QUESTION:** 20

The key difference between internal and external customers is:

- A. Their interest in the product or service
- B. Internal customers can influence the design of the product
- C. External customers usually influence the design of the product
- D. External customers best determine the true quality of the product

**Answer:** D

In this question, the problem is to find the best answer among the four choices. What is unique or different? Answers a, b and c are true for both internal and external customers.

Answer d is best because the external customer's perception of quality really determines a company's survival.

**QUESTION: 21**

On surveys from customers, what do high customer satisfaction numbers NOT indicate?

- A. Customer satisfaction
- B. Customer service
- C. Customer loyalty
- D. Product quality satisfaction

**Answer: C**

This question seeks the best negative answer choice. Most questionnaires and surveys can measure degrees of customer satisfaction (answer a), customer service (answer b), and product quality (answer d). Satisfied customers are not necessarily very loyal (answer c).

**QUESTION: 22**

The fundamental purpose of establishing teams is to:

- A. Provide team members a form of job enrichment and broadening
- B. Improve the internal efficiencies of the organization
- C. Teach team members new problem solving skills
- D. Avoid spending money on outside consultants

**Answer: B**

Teams may provide particular members with opportunities to broaden their skill and experience sets, as well as increased visibility and self-satisfaction, but those are ancillary benefits, rather than the fundamental purpose of establishing teams. Teams are formed to improve processes and solve problems. Because this ultimately is designed to enable the organization to better perform its purpose with a lesser amount of wasted effort and resources, teams are ultimately formed to improve the efficiencies of the organization.

**QUESTION: 23**

Which six sigma role is most likely to define objectives for an improvement team?

- A. Leader
- B. Sponsor

- C. Facilitator
- D. Member

**Answer: B**

The team sponsor is often likely to define team objectives. The second best choice is the team leader, although this is usually not the case. Team facilitators and members do not define team objectives.

**QUESTION: 24**

Provide a non-technical definition for “Six Sigma” management.

**Answer:**

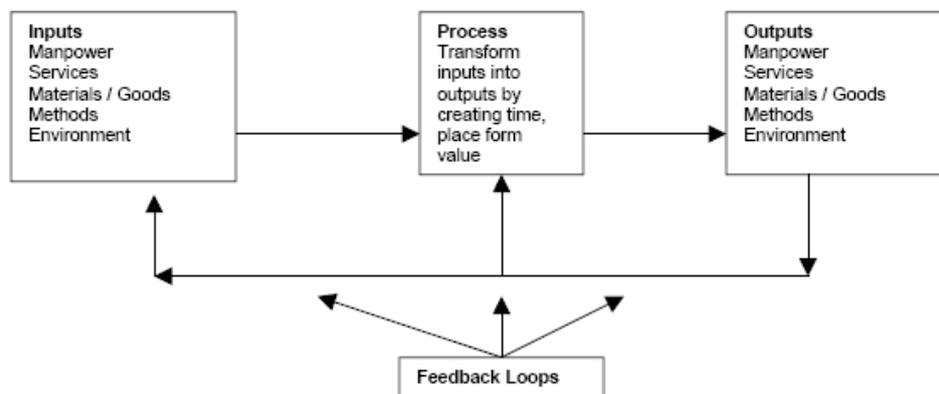
It is an organizational initiative designed to create breakthrough improvements in manufacturing, service and administrative processes. For example, Motorola established a goal to reduce defects 10-fold with a 50% reduction in cycle time every 2 years.

**QUESTION: 25**

Define a process. Draw a picture.

**Answer:**

A process is the vehicle for transforming inputs into outputs, see figure below. Feedback loops are used to move data to appropriate points in the process for decision making purposes.



**QUESTION: 26**

Describe the three types of feedback loops. (None, Special only, Common and Special cause)

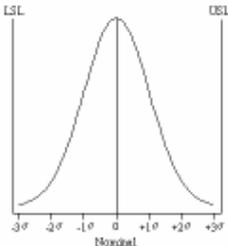
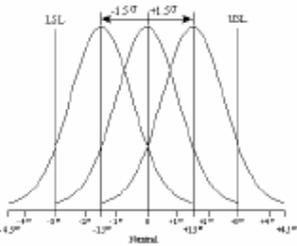
**Answer:**

- No feedback loop: A process without a feedback loop will deteriorate and decay due to entropy.
- Special cause only feedback loop: A process in which all feedback is treated as special will exhibit a doubling or explosion in the variation of its output.
- Special and common cause feedback loop: A process in which feedback is statistically recognized as common or special will experience improvement of its output.

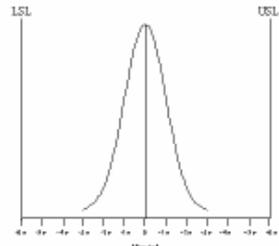
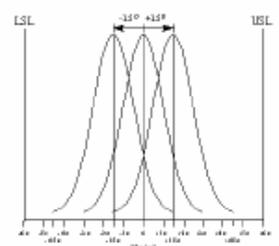
**QUESTION: 27**

Explain the origin of the “6” and “3.4” in Six Sigma management. Use a diagram that includes the Voice of the Customer and the Voice of the Process.

**Answer:**

<p><i>Voice of Customer equals Voice of Process</i>          - Process is stable and centered on nominal.          - 0.0 sigma shift in the mean results in 2,700 DPMO.</p>	<p><i>Voice of Customer equals Voice of Process</i>          - Process is stable.          - 1.5 sigma shift in the mean results in 66,807 DPMO.</p>
 <p>A normal distribution curve centered at 0 on the x-axis, which is labeled 'Nominal'. The x-axis has tick marks at -3σ, -2σ, -1σ, 0, +1σ, +2σ, and +3σ. Vertical lines represent the Lower Specification Limit (LSL) and Upper Specification Limit (USL), which are positioned at approximately -3σ and +3σ respectively.</p>	 <p>A normal distribution curve shifted to the right by 1.5σ. The x-axis is labeled 'Nominal' at 0. The curve's peak is at +1.5σ. The x-axis has tick marks at -1.2σ, -1σ, -0.8σ, 0, +0.8σ, +1σ, +1.2σ, +1.5σ, +1.8σ, +2σ, and +2.2σ. Vertical lines represent the LSL and USL limits. The distance from the LSL to the mean is 1.5σ, and the distance from the mean to the USL is 1.5σ.</p>

Through the continuous process improvement, the variation of process is reduced. Thus, the relationship between Voice of Customer and Voice of Process moves to a better level, Voice of Process is half the Voice of Customer, that is --- the process improves from a 3- sigma process to a 6-sigma process.

<p><i>Voice of Process is half Voice of Customer</i></p> <p>- Process is stable and centered on nominal.</p> <p>- 0.0 sigma shift in the mean results in 2 defects per billion opportunities.</p>	<p><i>Voice of Process is half Voice of Customer</i></p> <p>- Process is stable.</p> <p>- 1.5 sigma shift in the mean results in 3.4 <b>DPMO</b>.</p>
 <p>A normal distribution curve centered at 'Nominal' on the x-axis. The x-axis is marked with standard deviations from -4σ to +4σ. Vertical lines represent the Lower Specification Limit (LSL) and Upper Specification Limit (USL), which are positioned at approximately ±3.5σ from the nominal value.</p>	 <p>A normal distribution curve shifted to the right by 1.5σ from the 'Nominal' value. The x-axis is marked with standard deviations from -4σ to +4σ. Vertical lines represent the Lower Specification Limit (LSL) and Upper Specification Limit (USL). The curve's peak is at +1.5σ, and the specification limits are at approximately ±3.5σ. A double-headed arrow above the curve indicates the 1.5σ shift from nominal.</p>

**QUESTION: 28**

Describe the roles and responsibilities of a process owner.

**Answer:**

1. A Process Owner has the authority to change a process.
2. A Process Owner should be identified and designated early in a Six Sigma project.
3. A Process Owner is responsible for managing and holding the gains for the improved process, and for improving and innovating the process in the future.
4. A Process Owner empowers people in the process.
5. A Process Owner works with the project team. (This can also be a champion role.)
6. A Process Owner coordinates team logistics. . (This can also be a MBB or BB role.)
7. A Process Owner negotiates resources for team. . (This can also be a champion role.)
8. A Process Owner links process and organizational objectives. A Process Owner understands their process' capability and its relationship to the organization.
9. A Process Owner ensures that customer's needs take priority. (This is also mainly the responsibility of the top executives of an organization.)
10. Process owner optimizes the entire process, not just component of the process.

**QUESTION: 29**

Describe the roles and responsibilities of a champion.

**Answer:**

1. A Champion should be a member of the Executive Committee, or at least a trusted direct report of a member of the Executive Committee. Champions take a very active sponsorship and leadership role in implementing Six Sigma projects.
2. A Champion translates strategic measures into a project (coordinates with Executive Committee).
3. A Champion selects the team leader.

- 4.A Champion develops and negotiates the project charter.
- 5.A Champion removes obstacles to the project.
- 6.A Champion obtains resources and helps the team control the budget.
- 7.A Champion reviews team progress.
- 8.A Champion helps keep the team focused.
- 9.A Champion assures use of Six Sigma methods and tools.
- 10.Champion is the liaison between executive management and the project leader.

**QUESTION: 30**

Describe the roles and responsibilities of a black belt.

**Answer:**

- 1.A Black Belt is a full-time change agent who may not be an expert in the process under study.
- 2.A Black Belt serves as team leader.
- 3.A Black Belt is a master of the DMAIC model.
- 4.A Black Belt provides guidance and training to team members.
- 5.A Black Belt helps the team refine a project charter (assumes Champion / Process Owner drafted the initial charter)
- 6.A Black Belt interfaces with the champion and MBB.
- 7.A Black Belt leads the project team.
- 8.A Black Belt helps the team analyze data and design experiments.
- 9.A Black Belt provides training in tools and team functions.
- 10.A Black Belt helps the team prepare for reviews.
- 11.A Black Belt recommends strategic Six Sigma projects.
- 12.A Black Belt leads and coaches Green Belts leading lower-level teams.

**QUESTION: 31**

Describe the roles and responsibilities of a Green Belt.

**Answer:**

- 1.A Green Belt is a part-time (25%) project leader or member and provides most of the functions of a Black Belt (team leader) for lower-level project teams.
- 2.Green Belts are the “work horses” of strategic Six Sigma Management efforts. Most managers should be or become Green Belts.
- 3.For lower level teams, a Green Belt
- 4.Refines a draft project charter (process owners and champions should coauthor the first draft)
- 5.Reviews the draft charter with Champion
- 6.Selects team members
- 7.Facilitates the team

8. Communicates with the Champion and other stakeholders of the process
9. Analyzes data
10. Provides training in basic tools
11. Coordinates team efforts with higher level teams
12. Completes documentation z Completes the control plan z Spreads the lessons learned

**QUESTION: 32**

Describe the roles and responsibilities of a Master black belt

**Answer:**

A Master Black Belt is a proven leader and change agent for Six Sigma management. A Master Black Belt provides technical expertise in Six Sigma management.

1. Teaches Black Belts and Green Belts.
2. Mentors Black Belts and Green Belts.
3. Coordinates several Black Belt projects simultaneously.
4. Improves and innovates the Six Sigma process.
5. Counsels top management on Six Sigma management.

**QUESTION: 33**

Create a service example to explain rolled throughput yield, DPO, DPMO, process sigma.

**Answer:**

A service has 4 steps and each step has only one opportunity for a defect. The yield of step 1 is 0.99, the yield of step 2 is 0.95, the yield of step 3 is 0.99, and the yield of step 4 is 0.97. The four steps are independent of each other. What is the rolled throughput yield (RTY), the DPO, the DPMO, and the process sigma?

$$RTY = .99 \times .95 \times .99 \times .97 = .903$$

$$DPO = 1.0 - RTY = .097$$

$$DPMO = 97,000$$

$$\text{Process Sigma} = \text{approx } 2.8$$

**QUESTION: 34**

Construct a table that shows how to prioritize potential Strategic Six Sigma projects based on their relationships with business objectives. Explain how the table functions to accomplish its aim.

**Answer:**

				Six Sigma Project			
				Project 1	Project 2		Project 11
B O	BO1	W E I G H T S	W1				
	BO2		W2				
					1=weak		
	BOm		Wm		3=moderate		
Weighted Average of CTQs					9=strong		

1. Wis are developed by the Finance Department. The sum of  $W_i = 1.0$ .

2. Cell values are determined by team members with the strong guidance of the finance department.

The weighted averages that are shown in the last row of the columns are ranked from smallest to largest. The largest average is considered the highest priority project. Alternatively, a control chart could be used to find a project with a weighted average that is out of control on the high side from the other project's averages.

**QUESTION: 35**

Give an example of a project charter. Label each of the 5 parts of the project charter.

**Answer:**

Decrease (direction) of the number of customer complaints (CTQ measure) caused by at-home repairs (process) from 20 per day to 0 per day (CTQ target) by March 1, 2004 (deadline).

**QUESTION: 36**

Explain the term "SIPOC analysis." Construct a chart to illustrate your explanation.

**Answer:**

A SIPOC analysis is a simple tool for identifying the Suppliers and their Inputs into a Process, the high level steps of a process, the Outputs of the process, and the Customers (market) segments interested in the outputs.

**QUESTION: 37**

Define "CTQ." Relate your answer to a SIPOC analysis.

**Answer:**

CTQ stands for Critical to Quality characteristic. It is a characteristic of a process, product or service that is critical to the satisfaction of a stakeholder.

**QUESTION: 38**

Define "X" in respect to a SIPOC analysis.

**Answer:**

Xs are the inputs and process steps that cause variation in the outputs of a process (CTQs).

**QUESTION: 39**

What is the tactic of Six Sigma management in respect to Xs?

**Answer:**

- Define vital few Xs
- Identify level of critical Xs
- Select best actions needed to implement levels of critical Xs
- Implement critical Xs and test for best levels of critical Xs that minimize variation in the CTQs

**QUESTION: 40**

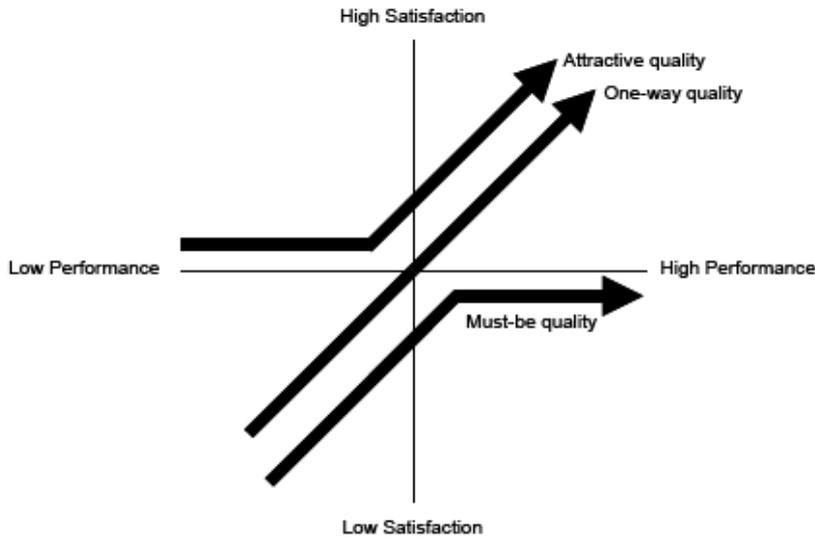
Define must-be, one way, and attractive quality that can result from a Kano survey. Make sure your answer is based on the dimensions of performance and satisfaction. Draw a picture to illustrate your explanation.

**Answer:**

Must-be- User satisfaction is not proportional to the performance of the feature. The lower the performance, the lower the user satisfaction, but high performance creates feelings of indifference to the feature.

One-way - User satisfaction is proportional to the performance of the feature; the less performance the less user satisfaction, and the more performance, the more user satisfaction.

Attractive - User satisfaction is not proportional to the performance of the feature; low levels of performance create feelings of indifference to the feature, but high levels of performance create feelings of delight to the feature.



**QUESTION: 41**

Provide an example of a question on a Kano survey.

**Answer:**

Column 1	Column 2	Column 3	Column 4
CTQs	<i>How would you feel if the following CTQ were present?</i>	<i>How would you feel if the CTQ were not present?</i>	<i>What percentage cost increase, over current costs, would you be willing to pay for this CTQ?</i>
<i>Study Center in the dormitory</i>	Delighted [ ] Expect it and like it [ ] No feeling [ ] Live with it [ ] Do not like it [ ] Other [ ]	Delighted [ ] Expect it and like it [ ] No feeling [ ] Live with it [ ] Do not like it [ ] Other [ ]	0% _____ 10% _____ 20% _____ 30% _____ 40% or more _____

**QUESTION: 42**

Give examples of classification attribute data. Explain why each example is classification attribute data.

**Answer:**

Examples of classification attribute data: classifying employees by department, classifying cars by makers, and so on. Each example is classification attribute data because items are classified into one of two or more categories.

**QUESTION: 43**

Give examples of count (area of opportunity) attribute data. Explain why each example is area of opportunity attribute data.

**Answer:**

Examples of count attribute data: number of union grievances per week, number of type errors in a page, number of chocolate chips in a cookie. Each example is count attribute data because it is from counts of the number of occurrences per unit.

**QUESTION: 44**

Give examples of measurement data. Explain why each example is measurement data.

**Answer:**

Examples of measurement data: cycle time, weight, and temperature. Measurement data are continuous data.

**QUESTION: 45**

What is the purpose of an operational definition.

**Answer:**

An operational definition promotes effective communication between people by putting communicable meaning into an adjective.

**QUESTION: 46**

Create an operational definition for "12 pound bar" that results in attribute data.

**Answer:**

Criteria: Select a bar from inventory. Place it on a digital scale. If the digital readout is between 11.999 and 12.001, inclusive, then the bar is classified as 12 pounds. If the digital readout is not between 11.999 and 12.001, inclusive, then the bar is classified as not 12 pounds.

Test: Select a particular bar and put it on the scale. Record the digital readout. Decision:

If  $11.999 \leq \text{digital readout} \leq 12.001$ , then bar = 12 pounds.

If digital readout  $< 11.999$  or digital readout  $> 12.001$ , then bar  $\neq$  12 pounds.

**QUESTION: 47**

Create an operational definition for "12 pound bar" that results in measurement data.

**Answer:**

Criteria: Use a digital scale to weigh a bar.

Test: Select a particular bar and put it on the digital scale. Record the digital readout.

Decision: Use bar based on digital readout.

**QUESTION: 48**

A customer wants to buy chocolate bars with a nominal weight of 6.0 ounces and will accept a tolerance of 0.05 ounces either side of nominal. As a supplier of chocolate bars you want to understand your process. Your process produces chocolate rectangles that are cut from larger blocks of chocolate and then packaged as six-ounce bars. Every 15 minutes, three chocolate bars are weighed, prior to packaging. The chart below shows the weights for each bar examined in a seven-hour day.

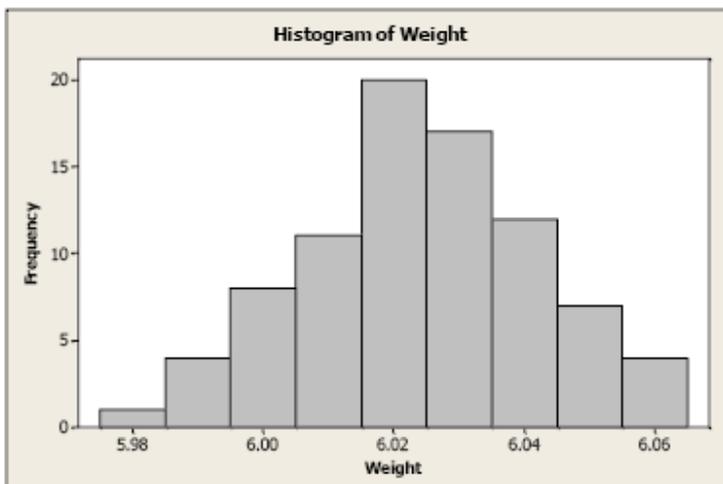
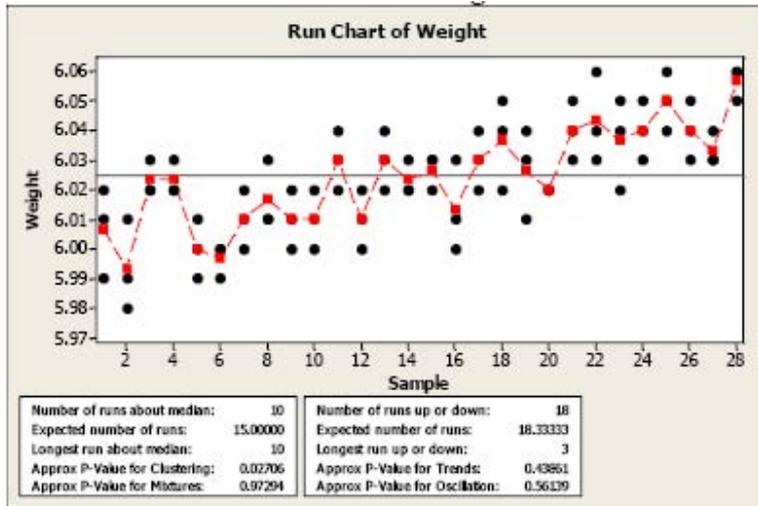
**Answer:**

Time	Observation #	Weight (oz)
9:15	1	6.01
	2	5.99
	3	6.02
9:30	1	5.98
	2	5.99
	3	6.01
9:45	1	6.03
	2	6.02
	3	6.02
	1	6.02

10:00	2	6.03
	3	6.02
10:15	1	6.00
	2	5.99
	3	6.01
10:30	1	5.99
	2	6.00
	3	6.00
10:45	1	6.02
	2	6.01
	3	6.00
11:00	1	6.01
	2	6.03
	3	6.01
11:15	1	6.01
	2	6.02
	3	6.00
11:30	1	6.00
	2	6.02
	3	6.01
11:45	1	6.04
	2	6.02
	3	6.03
12:00	1	6.02
	2	6.01
	3	6.00
12:15	1	6.03
	2	6.02
	3	6.04
12:30	1	6.02
	2	6.02
	3	6.03
12:45	1	6.03
	2	6.02
	3	6.03
1:00	1	6.03
	2	6.00
	3	6.01
1:15	1	6.04
	2	6.02
	3	6.03
1:30	1	6.05
	2	6.02
	3	6.04
1:45	1	6.03
	2	6.04

**QUESTION:** 49

Use Minitab to construct a run chart and a histogram from this data set.



Interpret the charts. What conclusions about the distribution of the weights can you reach based on these charts?

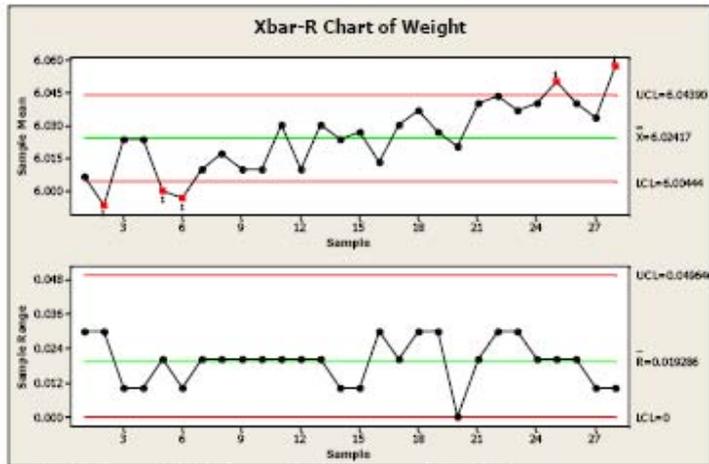
**Answer:**

The histogram shows that the most of chocolate bars weigh more than 6.00 ounces. The run chart shows that the observed weights plotted over time have upward drift in the weights of chocolate bars throughout the day. The run chart also indicates the need for action on the process.

**QUESTION:** 50

Use Minitab to construct an  $\bar{X}$  and R-chart from this data set. Is the process stable? If no, at what times is it unstable?

**Answer:**



No, when 9:30am, 10:15am, 10:30am, 3:15pm and 4:00pm.

**QUESTION: 51**

What is the overall process mean?

**Answer:**

6.024

**QUESTION: 52**

What is the estimate of the process standard deviation?

**Answer:**

$(0.019286/d_2) = (0.019286/1.693) = 0.01139$ .

**QUESTION:**

Show the formula you used to estimate the process standard deviation.

**Answer:**

$(R \div d_2)$

**QUESTION: 53**

Why did you use this formula versus another formula?

**Answer:**

( $R \div d_2$ ) was used instead of the formula for the sample standard deviation because ( $R \div d_2$ ) considers only short term variation, while the formula for the sample standard deviation considers long term variation.

( $R \div d_2$ ) assumes that the process is stable. If the process is not stable, the out of control points will jump out of the control limits based on ( $R \div d_2$ ). The ( $R \div d_2$ ) limits are tighter than limits based on the sample standard deviation.

**QUESTION: 54**

State the LSL and USL for the above process.

**Answer:**

LSL = 5.95 and USL = 6.05

**QUESTION: 55**

Calculate the actual process yield using the empirical data.

**Answer:**

$80 \div 84 = 0.952$

**QUESTION: 56**

Calculate the theoretical process yield using the normal distribution. Is this a reasonable calculation? If yes, why? If no, why not?

**Answer:**

ZLSL =  $(5.95 - 6.024) / 0.01139 = -6.4969$ , hence,  $P(X < -6.4969) = 0.0000$

ZUSL =  $(6.05 - 6.024) / 0.01139 = 2.2827$ , hence,  $P(X > 2.2827) = 0.0112$

$P(5.95 \leq X \leq 6.05) = 0.0000 + 0.0112 = 0.0112$

The above calculation is not reasonable because the process is not in statistical control.

**QUESTION: 57**

Compute the actual DPMO from the empirical data.

**Answer:**

$DPO = 1 - RTY = 1 - 0.952 = 0.048$

$$\text{DPMO} = 1,000,000 \times \text{DPO} = 1,000,000 \times 0.048 = 48,000 \text{ DPMO}$$

**QUESTION: 58**

Compute the theoretical DPMO using the normal distribution. Is this a reasonable calculation? If yes, why? If no, why not?

**Answer:**

$$\text{DPO} = 0.0112$$

$$\text{DPMO} = 1,000,000 \times 0.0112 = 11,200$$

The DPMO calculation is not reasonable because the process is not stable at this time.

**QUESTION: 59**

Compute the Process Sigma. Which DPMO should you use? Why?

**Answer:**

Process sigma assuming a 1.5 sigma shift in the mean for the empirical DPMO of 11,200 is 3.1 to 3.2.

Process sigma assuming a 1.5 sigma shift in the mean for the theoretical DPMO of 48,000 is 3.7 to 3.8.

Neither DPMO should be used because the process is not stable. A process sigma calculation is not appropriate for this process at this time.

**QUESTION: 60**

Construct a control chart from the following data.

**Answer:**

Day	Number of Entries Inspected	Number of Defective Entries	Fraction of Defective Entries
1	200	6	0.03
2	200	6	0.03
3	200	6	0.03
4	200	5	0.025
5	200	0	0
6	200	0	0
7	200	6	0.03
8	200	14	0.07
9	200	4	0.02
10	200	0	0
11	200	1	0.005
12	200	8	0.04
13	200	2	0.01
14	200	4	0.02
15	200	7	0.035
16	200	1	0.005
17	200	3	0.015
18	200	1	0.005
19	200	4	0.02
20	200	0	0
21	200	4	0.02
22	200	15	0.075
23	200	4	0.02
24	200	1	0.005
Totals	4800	102	

**QUESTION:** 61

What type of data is in the above matrix?

**Answer:**

Classification type attribute data

**QUESTION:** 62

What type of control chart should be used to study the above data?

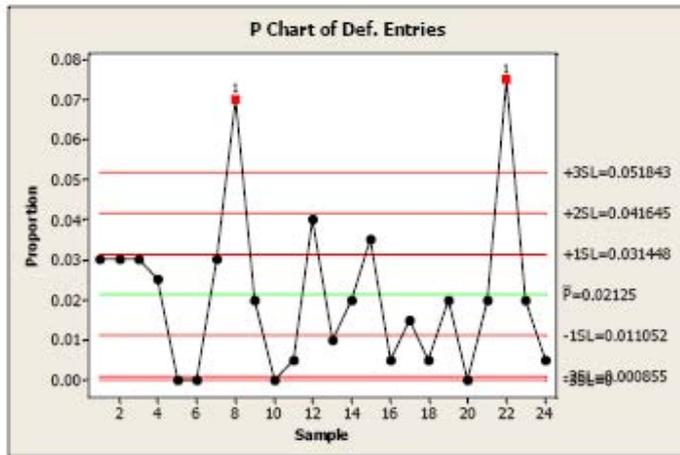
**Answer:**

p chart with constant subgroup size

**QUESTION:** 63

Use Minitab to construct a control chart for the above data.

**Answer:**



**QUESTION: 64**

Is the process stable? If not, on what days is it not stable?

**Answer:**

Days 8 and 22 are beyond the upper control limit.

**QUESTION: 65**

Analyze the following data set using a control chart.

**Answer:**

Monthly accident data is listed across the rows for 36 months

25	22	22	14	21	14	19	17	13	22	18	22	23	26	21
26	15	26	16	31	19	16	27	24	13	22	24	24	25	22
17	27	24	22	24	21									

**QUESTION: 66**

What type of data is in the above matrix?

**Answer:**

Count type attribute data

**QUESTION: 67**

What type of control chart should be used to study the above data?

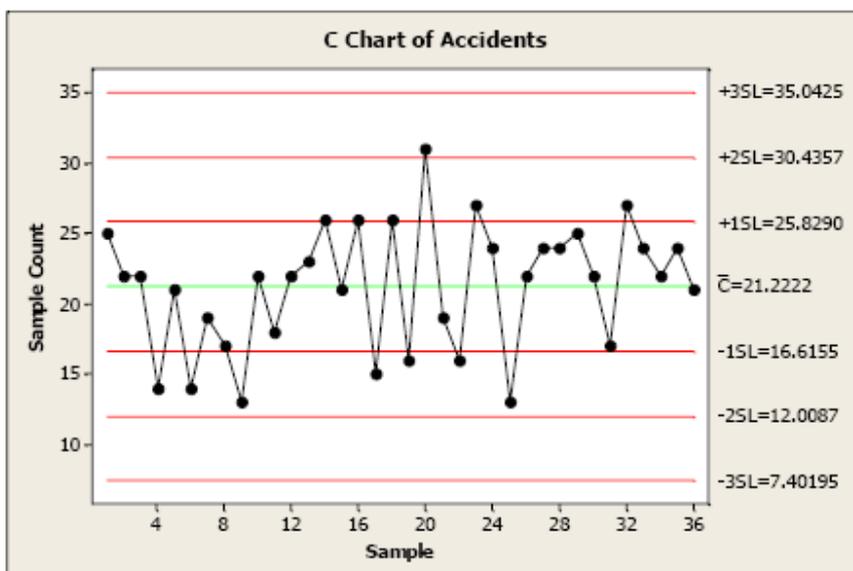
**Answer:**

c-chart

**QUESTION: 68**

Use Minitab to construct a control chart for the above data.

**Answer:**



**QUESTION: 69**

Is the process stable? If not, in what months is it not stable?

**Answer:**

Yes

**QUESTION: 70**

Construct a control chart for the following 3 years of weekly sales data for the Latin American Division of a hospital supply company.

**Answer:**

Weekly Hospital Supply data is listed across the rows for 3 years

20,594.0	39,447.7	34,884.9	30,895.5	24,420.5	25,774.4	21,847.8
32,095.5	37,328.1	26,053.5	34,475.1	23,539.9	29,721.0	36,508.4
31,972.7	20,496.3	31,970.9	21,406.3	20,123.7	25,977.4	22,057.3
29,258.7	27,054.7	19,044.3	19,096.2	12,629.3	21,780.3	8,161.7
29,876.2	30,136.4	26,456.7	30,099.8	20,265.1	30,219.2	18,621.7
30,116.9	22,898.7	23,167.3	12,889.2	22,943.3	26,445.9	17,671.1
22,689.7	32,186.2	27,144.3	40,109.7	23,210.1	24,863.2	16,859.6
23,640.8	32,579.6	16,155.0	29,424.0	19,994.2	37,201.9	36,673.1
24,034.6	20,082.6	31,597.9	12,122.8	15,737.4	35,017.2	16,550.8
19,720.4	21,028.6	22,531.0	29,792.0	17,870.4	25,190.8	26,550.6
13,394.4	29,292.0	29,478.6	11,839.4	26,331.7	29,647.5	24,929.8
24,959.7	6,594.5	17,086.2	4,945.2	23,232.7	17,871.3	22,874.1
28,181.8	26,110.9	18,595.0	28,770.3	18,607.7	38,645.3	21,746.6
23,092.9	32,058.7	31,578.4	29,364.7	6,872.8	13,886.7	38,049.8
32,245.3	26,072.7	27,118.6	24,881.4	27,277.2	30,522.2	33,493.6
35,899.3	27,833.8	20,321.1	36,236.4	29,992.1	25,029.5	23,004.0
33,282.1	28,741.1	17,702.2	25,963.0	13,915.7	25,416.9	21,448.6
27,494.1	21,020.7	33,265.4	35,491.0	27,897.6	19,611.2	14,903.2
30,608.8	14,694.7	29,046.7	36,153.4	34,614.4	24,937.3	28,996.3
5,991.3	9,056.1	31,705.0	32,959.2	11,831.6	24,567.5	21,397.9
21,335.7	19,655.3	27,238.7	19,239.4	31,899.1	22,663.4	18,906.8
14,227.5	29,180.8	25,484.7	23,547.2	25,919.4	14,761.7	18,666.0
26,977.7	17,805.9					

**QUESTION: 71**

What type of data is in the above matrix?

**Answer:**

Measurement data

**QUESTION: 72**

What type of control chart should be used to study the above data?

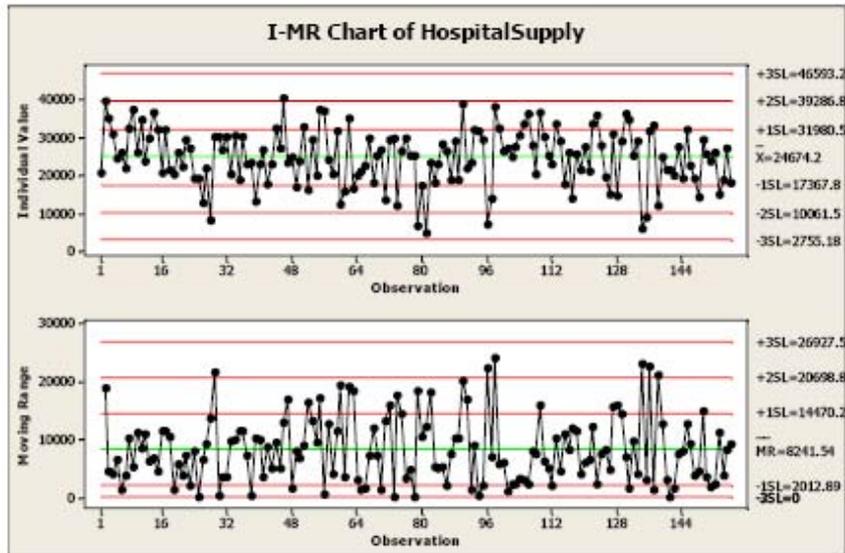
**Answer:**

An I-MR chart should be used due to measurement data and a subgroup size of one.

**QUESTION: 73**

Use Minitab to construct a control chart for the above data.

**Answer:**



**QUESTION: 74**

Is the process stable? If not, in what weeks is it not stable?

**Answer:**

The process is stable.

**QUESTION: 75**

Explain the purpose of a Gage R&R study.

**Answer:**

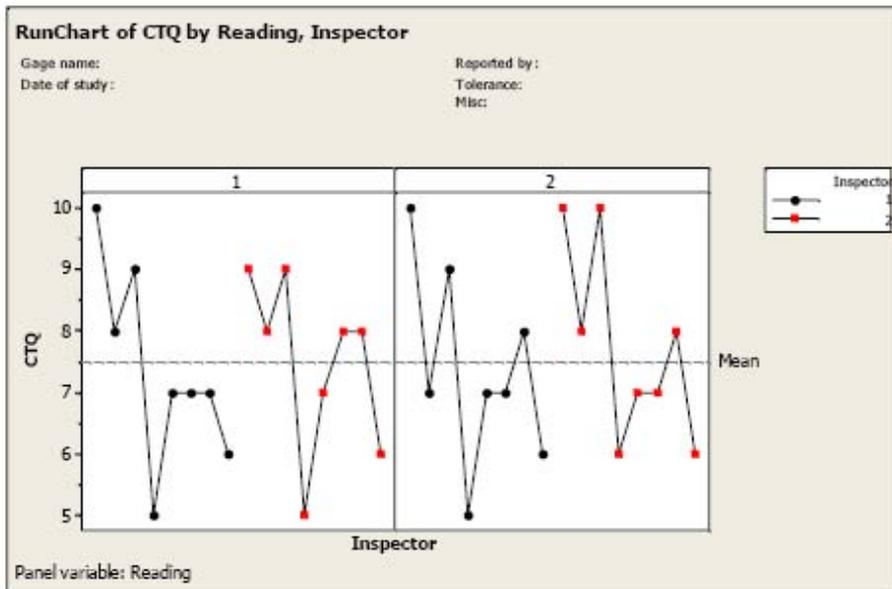
The purpose of a Gage R&R study is to define the validity of a measurement system, specifically, to estimate the proportion of observed variation due to unit-to-unit variation and measurement variation.

**QUESTION: 76**

Construct a Gage R&R run chart from the following data.

<u>Inspector</u>	<u>Reading</u>	<u>CTQ</u>
1	1	10
1	2	10
2	1	9
2	2	10
1	1	8
1	2	7
2	1	8
2	2	8
1	1	9
1	2	9
2	1	9
2	2	10
1	1	5
1	2	5
2	1	5
2	2	6
1	1	7
1	2	7
2	1	7
2	2	7
1	1	7
1	2	7
2	1	6
1	2	6
2	1	6
2	2	6
1	2	7
2	1	8
2	2	7
1	1	7
1	2	8
2	1	8
2	2	8
1	1	6
1	2	6
2	1	6
2	2	6

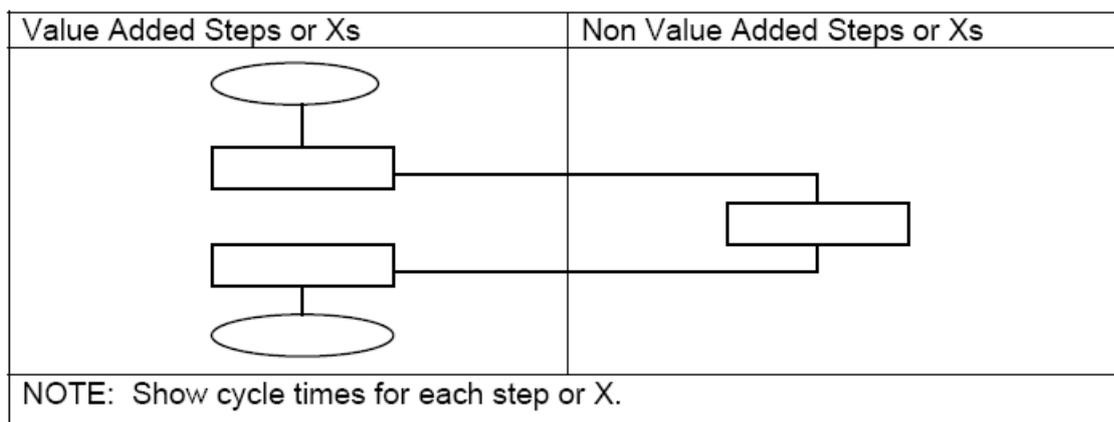
**Answer:**



**QUESTION: 77**

Explain how flowcharts can be constructed to identify and highlight the non-value added steps in a process.

**Answer:**

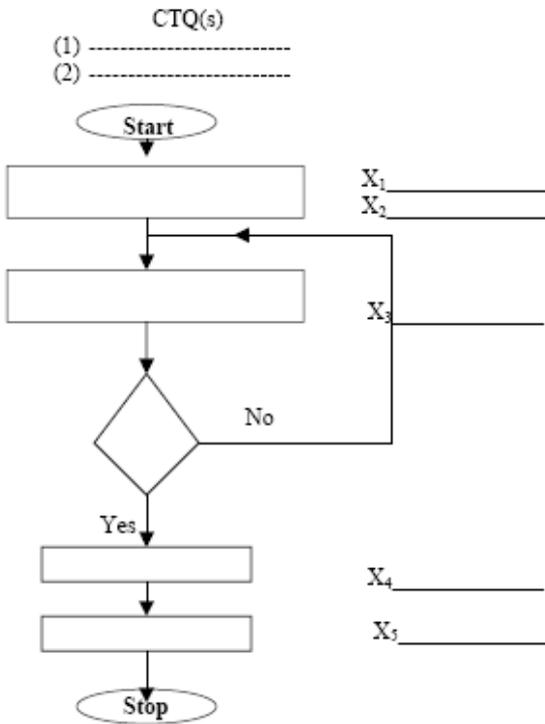


**QUESTION: 78**

Explain the relationship between  $Y = f(X)$  and a flowchart in respect to Six Sigma management.

**Answer:**

As you can see from the following figure,  $CTQ_1 = f(X_1, X_2, X_3, X_4, X_5)$  and  $CTQ_2 = f(X_1, X_2, X_3, X_4, X_5)$



**QUESTION: 79**

Explain how Failure Modes and Effects Analysis (FMEA) is used to identify the Xs that cause CTQs to be out of specification. Construct a table to illustrate your explanation.

**Answer:**

Failure Mode and Effects Analysis (FMEA) is used to identify, estimate, prioritize, and reduce the risk of failure in CTQs through the development of countermeasures based on Xs. There are 10 steps to conducting a FMEA. First, team members identify the critical parameters and their potential failure modes through brainstorming or other tools, that is, ways in which the design might fail (columns 1 and 2 of the table below). Second, team members identify the potential effect of each failure (consequences of that failure) and rate its severity (columns 3 and 4 of the table below). The definition of the severity scale is shown below. Third, team members identify causes of the effects and rate their likelihood of occurrence (columns 5 and 6 of the table below). The definition of the likelihood of occurrence scale is shown below. Fifth, team members identify the current controls for detecting each failure mode and rate the organization's ability to detect each failure mode

(columns 7 and 8 of the table below). The definition of the detection scale is shown below. Sixth, team members calculate the RPN (Risk Priority Number) for each failure mode by multiplying the values in columns 4, 6 and 8 (column 9 of the table below). Seventh, team members identify recommended actions and contingency plans, persons responsible, and target completion dates for reducing or eliminating each failure mode (columns 10 and 11 of the table below). Eighth, team members identify the date the action was taken to reduce or eliminate each failure mode (column 12 of the table below). Ninth, team members rank the severity (column 13 of the table below), occurrence (column 14 of the table below) and detection (column 15 of the table below) of each failure mode after the recommended action (column 10 of the table below) has been put into motion. Tenth, team members multiple the values in columns 13, 14 and 15 of the table below to calculate the RPN (Risk Priority Number) for each failure mode after the recommended action (column 16 of the table below) has been put into motion.

*Format for a FMEA*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Critical Parameter</i>	<i>Potential Failure mode</i>	<i>Potential Failure Effect</i>	<i>Severity</i>	<i>Potential Causes</i>	<i>Occurrence</i>	<i>Detection</i>	<i>RPN</i>	<i>Responsibility and Target Date</i>	<i>Action</i>	<i>Completion Date</i>	<i>Severity</i>	<i>Occurrence</i>	<i>Detection</i>	<i>RPN</i>	
<i>Before RPN =</i>									<i>After RPN =</i>						

*Definition of "severity" scale = likely impact of failure*

<i>Impact</i>	<i>Rating</i>	<i>Criteria: A failure could...</i>
<i>Bad</i>	<i>10</i>	<i>Injure a customer or employee</i>
<i>V</i>	<i>9</i>	<i>Be illegal</i>
<i>V</i>	<i>8</i>	<i>Render the unit unfit for use</i>

✓	7	Cause extreme customer dissatisfaction
✓	6	Result in partial malfunction
✓	5	Cause a loss of performance likely to result in a complaint
✓	4	Cause minor performance loss
✓	3	Cause a minor nuisance; can be overcome with no loss
✓	2	Be unnoticed; minor effect on performance
Good	1	Be unnoticed and not effect the performance

Definition of "Occurrence" scale = frequency of failure

Impact	Rating	Time Period	Probability of occurrence
Bad	10	More than once per day	> 30%
✓	9	Once every 3-4 days	< = 30%
✓	8	Once per week	< = 5%
✓	7	Once per month	< = 1%
✓	6	Once every 3 months	< = .3 per 1,000
✓	5	Once every 6 months	< = 1 per 10,000
✓	4	Once per year	< = 6 per 100,00
✓	3	Once every 1-3 years	< = 6 per million (approx. Six Sigma)
✓	2	Once every 3-6 years	< = 3 per ten million
Good	1	Once every 6-100 years	< = 2 per billion

Definition of "Detection" scale = ability to detect failure

Impact	Rating	Definition
Bad	10	Defect caused by failure is not detectable
✓	9	Occasional units are checked for defects
✓	8	Units are systematically sampled and inspected
✓	7	All units are manually inspected
✓	6	manual inspection with mistake proofing modifications
✓	5	process is monitored with control charts and manually inspected
✓	4	control charts used with an immediate reaction to out of control condition
✓	3	control charts used as above with 100% inspection surrounding out of control condition
✓	2	all units automatically inspected or control charts used to improve the process
Good	1	defect is obvious and can be kept from the customer or control charts are used for process improvement to yield a no inspection system with routine monitoring

**QUESTION: 80**

Define "capability of the process" in statistical terms.

**Answer:**

Capability is a measure of the relative relationship between the "Voice of the Process" and the "Voice of the Customer." This relationship considers the differential between the mean

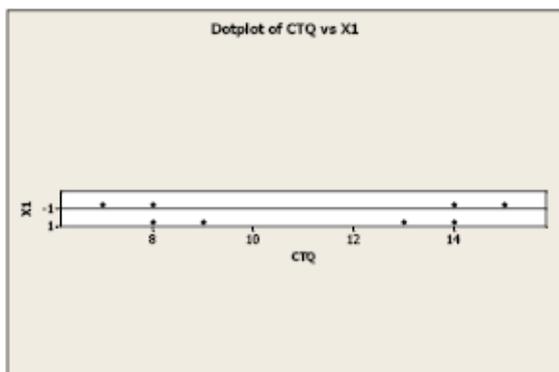
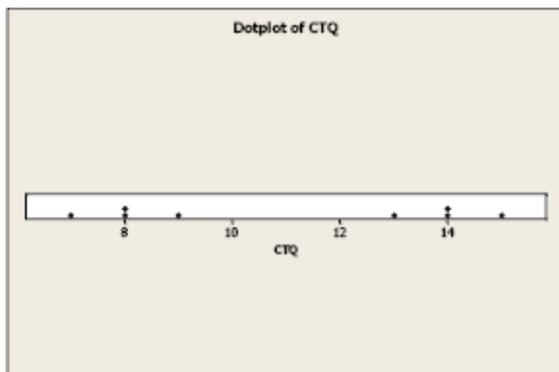
and nominal of the process. The capability of a stable and normally distributed process is defined as 99.73% of its output will be in the interval between LNL( $\text{mean} + 3[\sigma / \sqrt{n}]$ ) and UNL ( $\text{mean} - 3[\sigma / \sqrt{n}]$ ), given measurement data and a subgroup size between 2 and 10 inclusive.

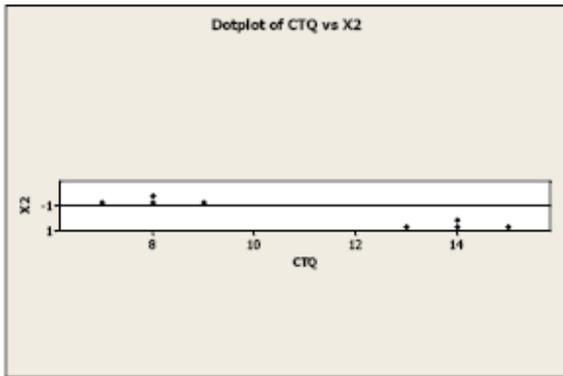
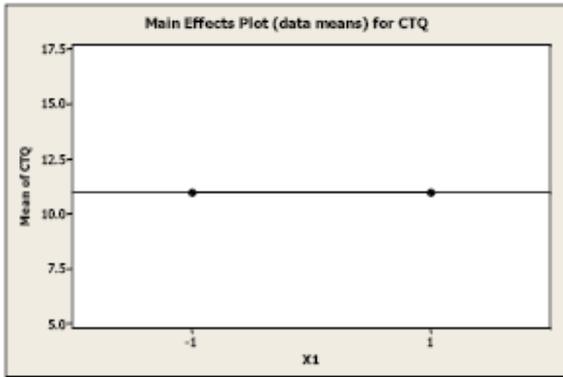
**QUESTION: 81**

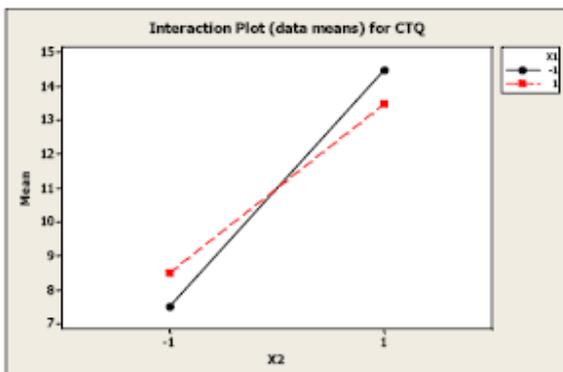
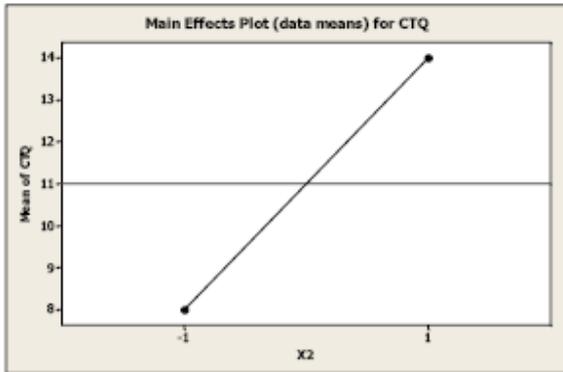
Construct a dot plot for the CTQ. Construct dot plots to study the CTQ for the different levels of X1 and X2. Construct main effects plots and interaction plots for the following data set.

X <sub>1</sub>	X <sub>2</sub>	CTQ
-1	-1	8
+1	-1	9
-1	+1	14
+1	+1	13
-1	-1	7
+1	-1	8
-1	+1	15
+1	+1	14

**Answer:**







There is a significant interaction between X1 and X2 that will affect the CTQ. The interaction is seen in the crossed lines.

**QUESTION:** 82

Explain the purpose of a 2k full factorial design.

**Answer:**

The purpose of a 2k full factorial design is to understand the relationships between a set of Xs each with only two levels, and the interactions of the X's, on the CTQ's.

To Read the [Whole Q&As](#), please purchase the [Complete Version](#) from [Our website](#).

# Trying our product !

- ★ **100%** Guaranteed Success
- ★ **100%** Money Back Guarantee
- ★ **365 Days** Free Update
- ★ **Instant Download** After Purchase
- ★ **24x7** Customer Support
- ★ Average **99.9%** Success Rate
- ★ More than **69,000** Satisfied Customers Worldwide
- ★ Multi-Platform capabilities - **Windows, Mac, Android, iPhone, iPod, iPad, Kindle**

## Need Help

Please provide as much detail as possible so we can best assist you.

To update a previously submitted ticket:



 <b>One Year Free Update</b> <p>Free update is available within One Year after your purchase. After One Year, you will get 50% discounts for updating. And we are proud to boast a 24/7 efficient Customer Support system via Email.</p>	 <b>Money Back Guarantee</b> <p>To ensure that you are spending on quality products, we provide 100% money back guarantee for 30 days from the date of purchase.</p>	 <b>Security &amp; Privacy</b> <p>We respect customer privacy. We use McAfee's security service to provide you with utmost security for your personal information &amp; peace of mind.</p>
---	---	--

## [Guarantee & Policy](#) | [Privacy & Policy](#) | [Terms & Conditions](#)

Any charges made through this site will appear as Global Simulators Limited.

All trademarks are the property of their respective owners.

Copyright © 2004-2015, All Rights Reserved.