Sample Answers to In-Text Questions

# Chapter 6: Quality Improvement and Control Tools

## Discussion Questions

1. What is a control chart?

Answer: It is a graph showing whether a process is stable, or going out of control. It has upper and lower limits and a mean centerline that a company is trying to achieve for a process.

1. What is the difference between an attribute and a variable?

Answer: Attributes are characteristics that are counted as good bad, broken, defective, etc. Variable are quality characteristics that are measured on a continuous scale, like time or weight.

1. Why should a mean chart and a range chart be used together to determine if a process is in control?

Answer: A mean chart looks at average values, and a range chart looks at variation of characteristics within a sample. A process is not really in control unless it meets both the mean and the range distribution criteria.

1. What is the difference between a c-chart and a p-chart?

Answer: They both track attribute characteristics. C charts counts the occurrences of defects, and a P chart registers the proportion of errors or defects in a product or service.

1. What is the difference between specification limits and control limits?

Answer: Specification limits reflect a particular customer’s requirements. The control limits are established based on the actual past performance of the process, without considering the customer’s established requirements.

1. What conditions should be met in order to conclude that a process is in control using control charts?

Answer:

* Given 3σ control limits, all sample data plotted fall within the control limits.
* The plotted points are clustered around the center line and are randomly distributed and have no discernible pattern.
* An approximately equal number of plotted points fall above and below the centerline.
* There are no runs of 8 successive points on either side of the center line.
* Two out of 3 successive points do not fall within zone C.
* Four out of 5 consecutive points do not fall within zone C, zone B, or both.
* Fifteen consecutive points are not within zone A

1. What is the Taguchi loss function, and how is it used to improve the quality of designs?

Answer: The TLF uses a quadratic equation to quantify possible monetary losses incurred by the manufacturer, customer, and society as a whole due to poor product quality.

1. Select a fast-food restaurant, a bank, and a hotel and identify some of the processes in each of these businesses for which control charts could be useful.

Answer: Student examples will vary.

1. What information on a process’s capability do the Cp and Cpk indexes provide individually and jointly?

Answer: Cp is the process capability index. Cpx is the process centering capability index. One shows capability, and the other shows how well the process is centered between the specification limits. The more desirable is when both are high.

1. If you conclude using a control chart that a process is in control, can you also assume that the process is also capable?

Answer: It is not capable if the control limits exceed the specification limits, even though it is in control.

1. State the difference between tolerance and control limits

Answer: Tolerance refers to the design specification limits, and the control limits are the parameters based on the actual past performance of the process. The first is the voice of the customer, and the second is the voice of the process.

1. Visit a hospital, bank, and a grocery store and identify the different processes that can be monitored using a control chart.

Answer: Student examples will vary.