1. Which of the following statements is more of a general characteristic of a manufacturing organization, as compared to a service organization?
   A) Operations are more capital intensive.  
   B) Quality is more difficult to measure.  
   C) Outputs are more intangible.  
   D) Short-term demand tends to be highly variable.  

2. Bill's landscaping service has three lawn mowers and has 3 workers. With this crew they can mow a 2 acre lawn in one hour. What is the productivity of one worker per 8 hour day?
   A) greater than 4 but less than 7 acres per day 
   B) less than 1 acre per day 
   C) greater than 1 but less than 4 acres per day 
   D) greater than 7 acres per day 

3. Which of the following is not a characteristic of service operations?
   A) intangible output 
   B) high customer contact 
   C) high labor content 
   D) easy measurement of productivity 
   E) low uniformity of output 

4. Which one of the following would not generally be classified under the heading of transformation?
   A) assembling 
   B) teaching 
   C) staffing 
   D) farming 
   E) consulting 

5. Which of the following is true?
   A) Corporate strategy is shaped by functional strategies.  
   B) Corporate mission is shaped by corporate strategy. 
   C) Functional strategies are shaped by corporate strategy.  
   D) External conditions are shaped by corporate mission.  
   E) Corporate mission is shaped by functional strategies. 

6. Gourmet Pretzels bakes soft pretzels on an assembly line. It currently bakes 800 pretzels each 8-hour shift. If the production is increased to 1,200 pretzels each shift, the productivity increases by:
   A) 50% 
   B) 33% 
   C) 25% 
   D) 67% 
   E) cannot be determined from the information given 

7. The three major functions of business organizations:
   A) overlap 
   B) are mutually exclusive 
   C) exist independently of each other 
   D) function independently of each other 
   E) do not interface with each other 

8. Quality planning and administration, quality training, and quality control procedures are examples of:
   A) internal failure costs 
   B) external failure costs 
   C) appraisal costs 
   D) prevention costs 
   E) replacement costs 

9. "Quality at the source" implies
   A) lower yield losses.  
   B) higher rework costs.  
   C) less expensive raw materials.  
   D) more final-test inspectors. 

10. Which of the following statements relating to total quality management is true?
A) To produce 100 good units in a process with a 20 percent defective rate, the company must produce a total of 120 units.
B) Poor quality generally does not increase the inventory level or lead times.
C) The only effect of internal failure is loss of material.
D) High product quality in manufacturing can have significant market implications for a firm.

11. Which of the following is not a major way in which poor quality affects an organization?
   A) reputation and image
   B) liability
   C) productivity
   D) costs
   E) payroll taxes

12. Fixing a problem will often cost money; to minimize these costs it is best to find and fix the problem:
   A) just before shipping our product to the customer
   B) immediately after we complete the last operation
   C) during the design phase
   D) just before we begin the first production operation
   E) regardless of when you fix the problem, costs are about the same

13. A manager of a fiberglass molding operation suspects that the number of defects is related to the number of total units produced of a particular product. A tool most useful in this analysis would be a
   A) checklist.
   B) cause-and-effect diagram
   C) scatter diagram.

14. Regarding control charts, a Type I error refers to
   A) concluding that the process is incapable when it is not.
   B) concluding that the process is in control when it is not.
   C) concluding that the process is out of control when it is in control.
   D) greater than Type II error.

15. A company is interested in monitoring the number of complaints per 100 customers. An appropriate control chart would be
   A) x-chart.
   B) c-chart.
   C) p-chart.
   D) R-chart.

16. For which of the following would a p-chart be used?
   A) monitor average shrinkage
   B) monitor dispersion in sample data
   C) monitor the fraction defective
   D) monitor the number of defects per unit
   E) monitor the range of values

17. A plot below the lower control limit on the range chart:
   I. should be ignored since lower variation is desirable
   II. may be an indication that process variation has decreased
   III. should be investigated for assignable cause
   A) I and II
   B) I and III
   C) II and III
   D) II only
   E) I, II, and III
Problems:

1. Given the following sample observations, construct an appropriate control chart for an alpha risk of 0.01. Is there any assignable cause of variation?

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<th>2</th>
<th>3</th>
<th>4</th>
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<td>12</td>
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