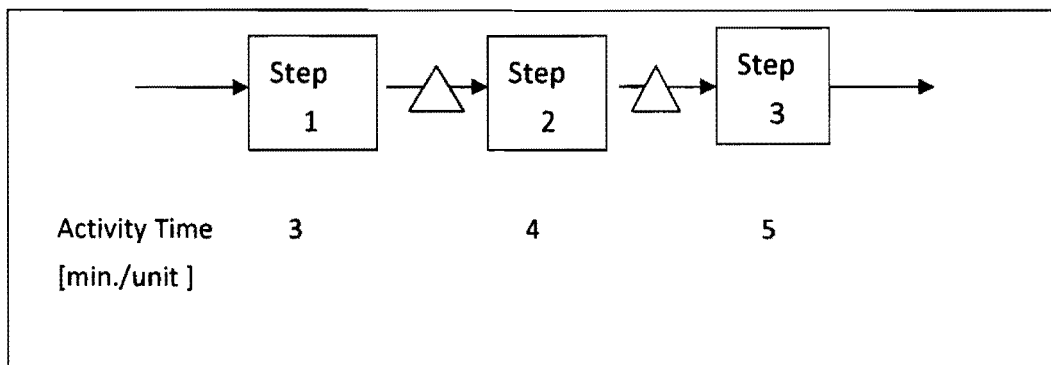


一. (25 %) Please explain the following terminology:

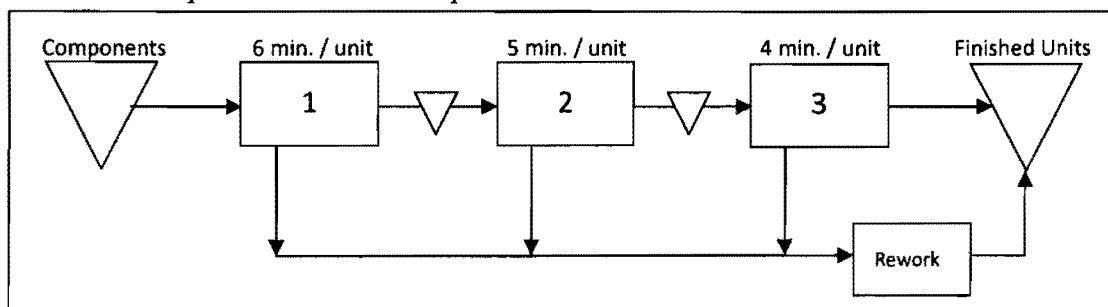
- (a) Business process reengineering
- (b) Six Sigma improvement model
- (c) Critical Path Method
- (d) Quality loss function
- (e) Line balancing

二. (15 %) Consider a worker-paced line with three process steps, each of which is staffed with one worker. The sequence of the three steps does not matter for the completion of the product. Currently, the three steps are operated in the following sequence.



- (a) What would happen to the inventory in the process if the process were operated as a push system?
- (b) Assuming you would have to operate as a push system, how would you resequence the three activities?
- (c) How would you implement a pull system?

三. (20%) Consider the following three-stage production process of glass ceramics, which is operated as a worker-paced line.



The process is experiencing severe quality problems related to insufficiently trained workers. Specifically, 20 percent of the parts going through operation 1 are badly processed by the operator. Rather than scrapping the unit, it is moved to a highly skilled rework operator, who can correct the mistake and finish up the unit completely within 15 minutes.

The same problem occurs at station 2, where 10 percent of the parts are badly processed, requiring 10 minutes of rework. Station 3 also has a 10 percent ratio of badly processed parts, each of them requiring 5 minutes by the rework operator.

- (a) (6 %) What is the utilization of station 2 if work is released into the process at a rate of 5 units per hour?
- (b) (6 %) Where in the process is the bottleneck? Why?
- (c) (8 %) What is the process capacity?

四. (40 %) (單選)

1. Consider the all unit discount schedule. If a larger quantity is ordered,
  - a. both the unit cost and total cost may decrease
  - b. unit cost may decrease but the total cost increases
  - c. both the unit cost and total cost may increase
  - d. total cost may decrease but the unit cost increases
2. The following are some characteristics of the EOQ model cost curve
  - a. Total annual holding cost is the same as total annual ordering cost
  - b. The total annual cost does not change much from the optimal value if the order quantity is near the EOQ value
  - c. Both of the above
  - d. None of the above
3. Big Apple Appliances sells trendy electronic appliances in two different markets: New York and Chicago. Both the New York and Chicago markets have weekly demands that are normally distributed with means 200 and standard deviations 60. The demands in the two markets are positively correlated. Which of the following observations is definitely false?
  - a. Week 1 and week 2 demands in the New York market were 200 and 400 units. The demands in Chicago market over the same time periods were 400 and 100 units, correspondingly.
  - b. Average demand over the past 10 weeks in the two markets differs by 50 units.
  - c. Over the past 10 weeks, total demand in New York was 1500 units higher than the demand in the Chicago market.
  - d. The coefficient of variation of the total demand from both the markets is 0.15.
  - e. The retailer sold more units in Chicago than in New York over the past several weeks.

4. You are choosing between make-to-stock and make-to-order production modes for a new product. Which one of the following best supports the make-to-stock production choice?
  - a. Customers are willing to wait for their orders.
  - b. Competitors offer channel incentives.
  - c. Demand for the product is smooth throughout the year.
  - d. Components of the product are not well modularized.
  - e. Cost of underage is much lower than cost of overage.
5. Assume a firm implements an order up to inventory model with an order up-to level of 100. The lead time is 3 periods, demand is normally distributed and the target in-stock level is 99%. Which of the following will never be observed just after an order is placed?
  - a. There are 80 units on-order.
  - b. There are 90 units on-order and 7 units on-hand.
  - c. 18 units were just ordered.
  - d. There are 230 units backordered.
  - e. None of the above.
6. Some firms in the PC industry practice channel assembly. With channel assembly a supplier provides a distributor with approved parts, e.g., mother boards, disk drives, video cards, etc. The distributor then completes final assembly of the supplier's PC in response to actual demand. Before the implementation of channel assembly the distributor would merely hold finished goods inventory which the supplier assembled. This innovation is similar to
  - a. Make-to-stock strategy (e.g., using the newsvendor model).
  - b. Reactive capacity strategy.
  - c. Assemble-to-order/direct-sale strategy.
  - d. Postponement strategy.
  - e. Mass customization strategy.
7. Amazon started with one warehouse but now has seven warehouses. Amazon's decision to increase the number of warehouses it operates resulted in
  - a. Higher overhead costs and lower technology costs.
  - b. Higher service level and lower inventory costs.
  - c. Higher inventory costs and lower shipping costs.
  - d. None of the above.

8. Capacity pooling in the form of flexible capacity is most valuable when
  - a. capacity is significantly greater than the expected demand.
  - b. capacity is significantly smaller than the expected demand.
  - c. capacity is approximately equal to the expected demand.
  - d. the capacity size relative to demand does not matter.
  
9. Which of the following is most accurate about revenue sharing in a supply chain with two firms, a retailer and a supplier?
  - a. Revenue sharing shifts supply chain profit from the retailer to the supplier.
  - b. Revenue sharing shifts supply chain profit from the supplier to the retailers.
  - c. Revenue sharing is designed to improve response times in the supply chain.
  - d. Revenue sharing is designed to improve forecasting within the supply chain.
  - e. Revenue sharing is beneficial if increased product availability increases total supply chain profit.
  
10. In the order up-to model, assume that the mean of demand in a period remains the same and the order up-to level is kept at a constant level. If the demand uncertainty (the standard deviation of demand in each period) increases,
  - a. the expected inventory at the end of each period would increase.
  - b. the expected inventory at the end of each period would decrease.
  - c. the expected inventory at the end of each period would remain unchanged.
  - d. the expected inventory at the end of each period may go up or down.