

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. List the 7 basic quality tools for process improvement. Briefly describe each of them and suggest the best scenario for each of them. (20%)

2. An engine part workshop uses Kanban containers that hold 240 parts. It takes 120 minutes of setup plus run time to fill a container. Moving the container to the next workstation, waiting time, processing time at the next workstation, and return of the empty container take 90 minutes. Assume the average demand rate for the parts is 300 units per hour. (15%)
 - (a) Find the number of containers needed for the system.
 - (b) What is the maximum inventory in the system?
 - (c) What is the takt time for this process?

3. The ABC Company is planning to introduce a new product. There are two options for manufacturing processes. Plan A is to produce the product from scratch in their own factory. It requires \$80,000 investment in the new equipment and the variable cost for each unit is \$500. Plan B is to buy semi-finished goods (costs \$100 per unit) from outside and refine to their own specifications. The new modifying machines cost \$500,000 but the variable cost for each unit is just \$150. (15%)
 - (a) What is the break-even quantity for these two options?
 - (b) Discuss the benefits and disadvantages for each of options from an operational point of view.

4. Since the green concept and carbon emission issue are prevalent in recently years, remanufacturing has been incorporated into business operations for firms to both improve their profitability and fulfill their social responsibility. If, also for the sake of environmental protection, your firm considers to produce products using some used (recycled) materials (parts), as the manager of the operation management department, what would you do to smooth the remanufacturing process in terms of (1) demand forecasting; (2) materials collecting and handling; (3) inventory control; (4) capacity planning; and (5) quality management. Please describe your approaches for each aspects in detail, and compare them to those with the regular production process. (25%)

5. What are decentralized and centralized supply chains? (4%) What is the bullwhip effect? (2%) Why decentralized supply chains often earn less profits than centralized ones? (3%) In order to improve the profitability of the whole supply chain (to be more close to that of an equivalent centralized supply chain), members in a decentralized supply chain might coordinate. However, not all members are willing to coordinate. Why? (4%) Please describe what coordination mechanisms they can used and how can they implement them. (8%) Moreover, does information sharing plays an important role during the coordination process? Why or why not (4%)