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1. A hospital is considering a new procedure to be offered at $200 per patient. The fixed cost per year would be $100,000, with total variable costs of $100 per patient. What is the break-even quantity for this service? Use both algebraic and graphic approaches to get the answer. **(10%)** In addition, the same hospital performs a sensitivity analysis of this procedure. What will happen if 1,200 patients have this new procedure? **(5%)**

2. As to the operation strategies for change, decisions that are made must be translated into actual process designs or redesigns. Accordingly, two different but complementary philosophies for process design: (1) process reengineering and (2) process improvement. Try to explain and differentiate these two above mentioned approaches **(10%)**; and further address why they can be complementary. **(10%)**

3. The Pak Company in Hong Kong produces front hydraulic brake assemblies for use in the braking systems of full-size beach scooters or mopeds. A typical container of parts spends 0.03 day in processing and 0.07 day in materials handling and waiting during its manufacturing cycle. The daily demand for the part is 500 units. Management believes that demand for the hydraulic brake assembly is uncertain enough to warrant a safety stock equivalent to 10 percent of its authorized inventory.

   a. If each container contains 5 assemblies, how many containers should be authorized each day? **(5%)**

   b. Suppose that a proposal to use larger containers would increase the number of assemblies that can be packed to 10. Larger containers will help reduce shipping costs. However, using the larger containers increases the materials handling and wait time per container by 0.02 day. How many containers would be needed per day? **(5%)** How much inventory will be needed? **(5%)**

(背面仍有題目,請繼續作答)

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4. (10%) Explain the bullwhip effect in the supply chain, and describe the internal causes and external causes which will cause the bullwhip effect.

5. (10%) For a Q system, give the formulation to determine the reorder point when demand is variable and lead time is constant. You should provide the sufficient descriptions and the necessary assumptions.

6、 (15%) The demand forecast for the next four periods is 90, 100, 120, and 140 units respectively. The plant has a regular capacity of 100 units per period, an overtime capacity of 10 units per period, and a subcontractor capacity of 5 units per period. There is a $5 per unit charge for regular production, an $8 per unit charge for overtime production, and a $9 per unit charge for subcontracting. The holding cost is $3 per unit per period, no shortages are allowed and the company has 5 units in inventory at the start of the planning period.
Fill out the following table. (Note: You should give the answers on the answer sheet. Do not write down your answers on this problem sheet.)

	Period 1	Period 2	Period 3	Period 4	Total Cost
Forecast	90	100	120	140	
Regular					
Overtime					
Subcontracting					
Ending Inventory					

7. (15%) An end item's demand forecasts for the next 10 weeks are 30, 30, 30, 30, 20, 20, 30, 30, 30, and 30 units. The current on-hand inventory is 100 units. The order policy is to produce in lots of 75. The booked customer orders for the item, starting with week 1, are 15, 38, 7, 5, 0, 3, 10, 0, 0, and 0 units. The lead time is 2 weeks.
(1) (7%) Develop a Master Production Schedule (MPS) for this end time.
(2) (8%) The marketing department has received five orders for this item in the following sequence:
Order 1 is for 20 units to be delivered in period 1
Order 2 is for 75 units to be delivered in period 4
Order 3 is for 90 units to be delivered in period 6
Order 4 is for 75 units to be delivered in period 7
Order 5 is for 90 units to be delivered in period 10
Assuming that the prospective MPS you developed in part (1) does not change, which orders would you be able to accept based on the available-to-promise (ATP)?