

國立中央大學101學年度碩士班考試入學試題卷

所別：工業管理研究所碩士班 乙組(一般生) 科目：生產作業與管理 共 2 頁 第 1 頁

本科考試禁用計算器

\*請在試卷答案卷(卡)內作答

- (8 pts) A retail telephone catalog company takes catalog orders from customers and then sends the completed orders to the warehouses to be filled. An operator processes an average of 50 orders per day. The cost of processing an order is \$1.15, and it costs \$0.65 to correct an order that has been filled out incorrectly by the operator. An operator averages 8 percent bad orders per day, all of which are reworked prior to filling the customer order. Please determine the quality-productivity ratio for an operator.
- (8 pts) Explain the difference between attribute- and variable-sampling plans.
- (14 pts) Joe Auto Company is a small manufacturer of cars, vans and trucks in Eastern Europe. Demand for each of Joe's three product lines has been healthy in recent months, but an impending labor strike threatens to slow down production. Joe's data on forecasted demand, labor requirements, and profit for each product line are shown in the table below.

Product Line	Weekly Demand (unit)	Labor Required per Unit	Profit per Unit
Cars	500	6 hours	\$1,200
Vans	100	4 hours	\$600
Trucks	200	2 hours	\$200

Joe estimates that even if the workers strike next week, the company can maintain a core of 75 workers, giving a maximum of 3,000 hours per week. Joe has been studying capitalism and has decided that if the strike occurs, he will absorb the reduced labor hours by decreasing production of those product lines that yield the least profit.

- (7 pts) Please generate a new production plan using Joe's logic.
  - (7 pts) How much projected profit will be lost next week if the strike materializes?
- (14 pts) By performing several mathematical manipulations, we can express the total cost equation for the basic EOQ model as

$$\text{Total annual inventory cost} = \sqrt{2C_o C_c D}$$

where,  $C_o$  = ordering cost,  $C_c$  = carrying cost, and  $D$  = annual demand.

Performing similar mathematical manipulation on the EOQ model with shortages will result in the following total cost equation for that model:

$$\text{Total annual inventory cost} = \sqrt{2C_o C_c D} \cdot \sqrt{\frac{C_s}{C_c + C_s}}$$

where,  $C_o$  = ordering cost,  $C_c$  = carrying cost,  $C_s$  = shortage cost, and  $D$  = annual demand.

Comparing these two total cost equations, what can you infer about the general relationship between the EOQ model with shortages and the basic EOQ model without shortages?

- (6 pts) What are the three inputs and three outputs of MRP?

注意：背面有試題

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6. (10 pts) A company has introduced a process improvement that reduces processing time for each unit, so that output is increased by 25% with less material, but one additional worker required. Under the old process, five workers could produce 60 units per hour. Labor costs are \$12/hour, and material input was previously \$16/unit. For the new process, material is now \$10/unit. Overhead is charged at 1.6 times direct labor cost. Finished units sell for \$31 each. What increase in productivity is associated with the process improvement?

7. (5 pts) For the data given below, what would the naive forecast be for the next period (period #5)?

Period	Demand
1	58
2	59
3	60
4	61

8. (5 pts) Given the following historical data, what is the simple three-period moving average forecast for period 6?

Period	Value	Period	Value
1	73	4	72
2	68	5	67
3	65		

9. (20 pts) Given the following process layout data for locating four departments (A, B, C, and D) in four areas (1, 2, 3, and 4):

From/To	1	2	3	4	From/To	A	B	C	D
1	-	50	100	150	A	-	10	40	50
2		-	50	100	B	30	-	10	70
3			-	50	C	60	10	-	40
4				-	D	30	50	20	-

- 9.1. (3 pts) What is the distance from area 3 to area 1?  
 9.2. (3 pts) What is the total flow between departments B and D?  
 9.3. (4 pts) If departments A through D were to be located in areas 1 through 4, respectively, what would be the total distance loads would be moved each month?  
 9.4. (5 pts) If department C must be located in area 1, what layout will minimize the total distance loads will be moved each month?  
 9.5. (5 pts) If transportation costs are \$.25 per load per foot moved, what are total monthly costs for an optimum layout?
10. (10 pts) A clothing manufacturer produces clothing in five locations in the U. S. In a move to vertical integration, the company is planning a new fabric production plant that will supply fabric to all five clothing plants. The clothing plants have been located on a coordinate system as follows:

Location	(X,Y)
A	7,2
B	4,7
C	5,5
D	6,2
E	8,4

- 10.1. (5 pts) If the amount of fabric shipped to each plant is equal, what is the optimal location for the fabric plant?  
 10.2. (5 pts) Shipments of fabric to each plant vary per week as follows: plant A, 200 units; plant B, 400 units; plant C, 300 units; plant D, 300 units; and plant E, 200 units. What is the optimal location for the fabric plant?

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