

國立中央大學 109 學年度碩士班考試入學試題

所別： 工業管理研究所碩士班 不分組(一般生)

共 2 頁 第 1 頁

科目： 生產作業與管理

本科考試禁用計算器

*計算題需計算過程，無計算過程者不予計分

*請在答案卷(卡)內作答

1. (10 points) Joanna French is currently working a total of 12 hours per day to produce 240 dolls. She thinks that by changing the paint used for the facial features and fingernails that she can increase her rate to 360 dolls per day. Total material cost for each doll is approximately \$3.50; she has to invest \$20 in the necessary supplies (expendables) per day; energy costs are assumed to be only \$4.00 per day; and she thinks she should be making \$10 per hour for her time. Viewing this from a total (multifactor) productivity perspective, what is her productivity at present and with the new paint?

2. (10 points) A firm uses simple exponential smoothing with $\alpha = 0.1$ to forecast demand. The forecast for the week of January 1 was 500 units whereas the actual demand turned out to be 450 units. Calculate the demand forecast for the week of January 8.

3. (20 points) Jackson Custom Machine Shop has a contract for 130,000 units of a new product. Sam Jumper, the owner, has calculated the cost for three process alternatives. Fixed costs will be: for general-purpose equipment (GPE), \$150,000; flexible manufacturing (FMS), \$350,000; and dedicated automation (DA), \$950,000. Variable costs will be: GPE, \$10; FMS, \$8; and DA, \$6. Which process should he choose?
 - (a) (5 pts) Solve the problem analytically,
 - (b) (5 pts) Solve the problem graphically,
 - (c) (5 pts) Using either your analytical solution found in (a) or the graphical solution found in (b), identify the volume ranges where each process should be used.
 - (d) (5 pts) If Jackson Custom Machine is able to convince the customer to renew the contract for another two years, what implications does this have for his decision?

4. (10 points) A major drug store chain wishes to build a new warehouse to serve the whole Midwest. At the moment, it is looking at three possible locations. The factors, weights, and ratings being considered are given below. Which city should they choose?

		Ratings		
Factor	Weights	Peoria	Des Moines	Chicago
Nearness to markets	20	4	7	5
Labor cost	5	8	8	4
Taxes	15	8	9	7
Nearness to suppliers	10	10	6	10

參考用

注意：背面有試題

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5. (12 pts) Explain the following terms.
- (a) (3 pts) Flow time
 - (b) (3 pts) Lateness
 - (c) (3 pts) Third-party logistics
 - (d) (3 pts) Delayed differentiation
6. (20 pts) Electronic Village stocks and sells a particular brand of personal computer. It costs the store \$450 each time it places an order with the manufacturer for the personal computers. The annual cost of carrying the personal computers in inventory is \$170. The store manager estimates that annual demand for the personal computers will be 1,200 units. Electronic Village allows shortages and the shortage cost is \$600 per unit per year. 【請將計算過程寫出來，否則不計分】
- (a) (5 pts) Please compute the optimal order size for this brand of personal computer.
 - (b) (5 pts) Please calculate the total inventory cost for this brand of personal computer.
 - (c) (5 pts) Please also calculate the number of orders that will be made annually for this brand of personal computer.
 - (d) (5 pts) Please also calculate the maximum inventory level for this brand of personal computer.
7. (18 pts) Please complete the following MRP matrix for item X.
 LLC = Low-Level Code, LT = Lead Time, PD = Past-Due Time Bucket

Item: X LLC: 1										
LT: 2 Lot Size: Minimum 50	PD	1	2	3	4	5	6	7	8	
Gross requirements		20	30	50	50	60	90	40	60	
Scheduled receipts			50							
Projected on hand	40									
Net requirements										
Planned order receipts										
Planned order releases										

- (a) (9 pts) In what periods should orders be released and what should be the size of those orders? 【請畫出 MRP 表格並填寫，而不是僅給最後的答案】
- (b) (9 pts) How would the planned order releases change with lot-for-lot (L4L) lot sizing? 【請畫出 MRP 表格並填寫，而不是僅給最後的答案】

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