

國立成功大學

112學年度碩士班招生考試試題

編 號：236

系 所：工業與資訊管理學系

科 目：生產與作業管理

日 期：0207

節 次：第 2 節

備 註：可使用計算機

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

1. (10%) List the major considerations of facility location decisions separately for service and manufacturing firms. Compare and contrast their similarity and difference.
2. (20%) The Green Oil Company currently uses simple exponential smoothing with smoothing factor $\alpha = 0.2$ to forecast weekly demand for its product. The management is considering adding a trend adjustment with smoothing factor $\beta = 0.5$ for a better prediction. Assume that the actual demand for this week is 45 and demands for the next six weeks are given in the following table. (Note: Round to two decimal places in your calculation.)

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
50	68	68	72	70	75

- (a) (6%) Find the forecast for Week 4 using simple exponential smoothing.
 - (b) (6%) Find the forecast for Week 4 using exponential smoothing with trend adjustment.
 - (c) (8%) Evaluate the mean absolute deviation (MAD) for both methods with six-week data. What is your conclusion?
3. (20%) The Big-O Company produces O-rings using compression molding with batch size 144. After the processes, all items receive a non-destructive inspection. If an item fails to pass inspection, it is classified as defective. Historically, if the process is operating under in-control conditions, the proportion of defectives is estimated 10%. The recent 12 samples of the number of defectives in a batch are given in the following table. (Note: Round to four decimal places in your calculation.)

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12
Number of Defectives	10	12	15	8	11	16	13	5	7	19	12	26

- (a) (10%) Find the control limits for the p -chart with 3 standard deviations.
 - (b) (10%) Draw the p -chart. Is the current process in control?

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4. (20%) NCKU Co. prepares its schedule. The forecasts and customer orders over the next eight periods are shown below. The beginning inventory is 60 units. The MPS rule is to schedule production if the projected on-hand inventory would be negative without production. The maximum production lot size of NCKU Co. is 70 units. The desired safety stock is 10 units, i.e., the maximum projected on-hand inventory is 10 units.

	1	2	3	4	5	6	7	8
Forecast	50	60	70	30	80	60	60	50
Customer Orders	40	50	50	10	10			

- a. (8%) Schedule the MPS over the eight periods.
- b. (6%) Determine the available-to-promise quantity for each period.
- c. (6%) Explain what the “level production” and “chase production” are? Explain what kind of strategy is adopted by NCKU Co.
5. (19%) Cheng-Kung food company (CKFC) sells croissants, which are sold for \$5 per unit. Daily demand is shown in the table below. The labor, materials, and overhead are estimated to be \$3.8 per unit. The leftover croissants at the end of each day are sold at 40% off.

Demand (Quantity)	Frequency	Demand (Quantity)	Frequency
100	0.01	106	0.10
101	0.06	107	0.12
102	0.11	108	0.09
103	0.16	109	0.03
104	0.15	110	0.03
105	0.14		

- a. (8%) What are the excess cost and shortage cost?
- b. (7%) What are the service level and the optimal quantity for CKFC a day?
- c. (4%) If the goodwill loss is \$0.3 when a shortage occurs, what is the optimal quantity for CKFC a day?

6. (11%) The information of the bill of materials, lead time, and quantities on hand is given below.

Item	Direct Components	Lead time (Week)	Amount on hand (Unit)
A	B(1), C(2)	1	--
B	D(2), E(1), F(2)	3	5
C	E(1), G(2)	2	10
D	--	1	0
E	--	2	0
F	G(2)	1	5
G	--	1	15

Note: Quantities used per unit are listed in parentheses

- a. (4%) Draw a tree diagram for Item A based on the bill of materials.
- b. (4%) If there are 20 units of Item A to be assembled, how many additional units of Items D, E, F, and G are needed?
- c. (3%) An order of Item A is scheduled to be shipped at the start of week 12. What is the latest week that the order can be started without delay?