

國立交通大學 102 學年度碩士班考試入學試題

科目：生產管理(5103)

考試日期：102 年 2 月 4 日 第 4 節

系所班別：工業工程與管理學系

組別：工工管系乙組

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【可使用計算機】*作答前請先核對試題、答案卷(試卷)與准考證之所組別與考科是否相符!!

Part (A): Problems (1)-(4)

An electronics company X-Corp sells products to USA. X-Corp establishes a subsidiary in USA. The average monthly sales of the USA subsidiary is NT\$10 billion dollars. The cost of goods sold (COGS) is 80% of the sales price. The products are shipped from Taiwan to USA by sea, taking about two months for transportation. X-Corp shipped products to its USA subsidiary once every month. Suppose the materials costs account for 50% of the cost of goods sold (COGS) for finished products. Materials are purchased twice every month (i.e., once every half month). Answer the following questions.

- (1) Estimate the average inventory level at the USA subsidiary. (8%)
- (2) Estimate the average inventory level on the sea transportation. (8%)
- (3) Estimate the average inventory level of finished goods at X-Corp, Taiwan. (8%)
- (4) Estimate the average inventory level of materials at X-Corp, Taiwan. (10%)

Part (B): Problems (5)-(9)

- (5) (5%) Please list at least five major subfunctions of shop-floor control
- (6) (5%) Please list at list five dispatching rules
- (7) (9%) Please list nine general principles of Optimized Production Technology (OPT)
- (8) (6%) Please list at least three requirements for JIT implementation
- (9) (8%) Please list four features of the service package in designing and scheduling of service systems

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Part (C): Problems (10)-(12)

(10) (12%) A supplier uses the policy of “quantity-discount” to encourage larger order quantities. Its price schedule is listed in the following table. The company estimates its annual demand is 960 units, ordering cost is \$45 per order, and with annual holding cost is 25% of the product’s unit price. How many products should be ordered to minimize total costs? If possible, please draw a figure to show its details.

Order quantity	Price per unit
0-199	60
200-399	57
400 or more	54

(11) (8%) A gift shop makes a \$10 profit per unit sold during the season, but it takes a \$5 loss per unit after the season is over. The following discrete probability distribution for the season’s demand has been investigated below. Draw a payoff table first and then determine the optimal number of gifts that should be purchased to earn maximal profit (batch size is 50).

Demand	100	150	250	350	450
Probability	0.2	0.25	0.3	0.15	0.1

(12) (13%) Product A is made from items B(2), C(1), and D(1). Item C (also an intermediate item) is made *only* by component D(2). Item B (also an intermediate item), *in turn*, is made from C (1) associated with a child D (2). Please draw the BOM for product A. Then, referring to the inventory records (see the following table), develop the MRP explosion for the next 6 weeks for items B, C, and D suppose the MPS start row has 500 units in week 6 for product A. (Hint: *POQ*- periodic order quantity, *L4L*- lot for lot, *FOQ*- fixed order quantity)

Category	B	C	D
Lot-sizing rule	POQ (P=2)	L4L	FOQ (Q=2,000)
Lead time	3 weeks	1 week	1 week
Scheduled receipts	None	None	2,000 (week 1)
Beginning inventory	100	0	200