

元智大學 九十七 學年度研究所 碩士班 招生試題卷

系(所)別: 工業工程與管理  
學系碩士班

組別: 不分組

科目: 生產管制

用紙第 1 頁共 2 頁

●不可使用電子計算機

**Problem 1.** (25%) The following table shows the time (hours) required to complete each of seven jobs on two machines. Each job must follow the same sequence, beginning with machine 1 and moving to machine 2.

Job	A	B	C	D	E	F	G
Machine 1	3	2	1	4	10	8	6
Machine 2	6	4	5	3	4	6	2

- (a) (4%) Determine a schedule using SPT based on the processing times of jobs on machine 1.
- (b) (7%) Determine a sequence by using Johnson's rule.
- (c) (14%) Which one of the sequences in (a) and (b) has the better performance in terms of total flow time? Which sequence minimizes the total idle time?

**Problem 2.** (25%) An assembly line contains the tasks shown as below. The manager wants an output of 200 units per day for the assembly line. The line works a 400-minute day.

- (a) (6%) Draw the precedence diagram.
- (b) (6%) Compute the cycle time needed and the minimum number of workstations required.
- (c) (10%) Assign tasks to workstations using the most following tasks rule.
- (d) (3%) Determine the efficiency of the resulting assembly line.

Task	Immediately	
	Precedes Task(s)	Task Time
A	B, C, D	0.5
B	E	1.4
C	E	1.2
D	F	0.7
E	G, J	0.5
F	I	1.0
G	H	0.4
H	K	0.3
I	J	0.5
J	K	0.8
K	M	0.9
M	end	0.3



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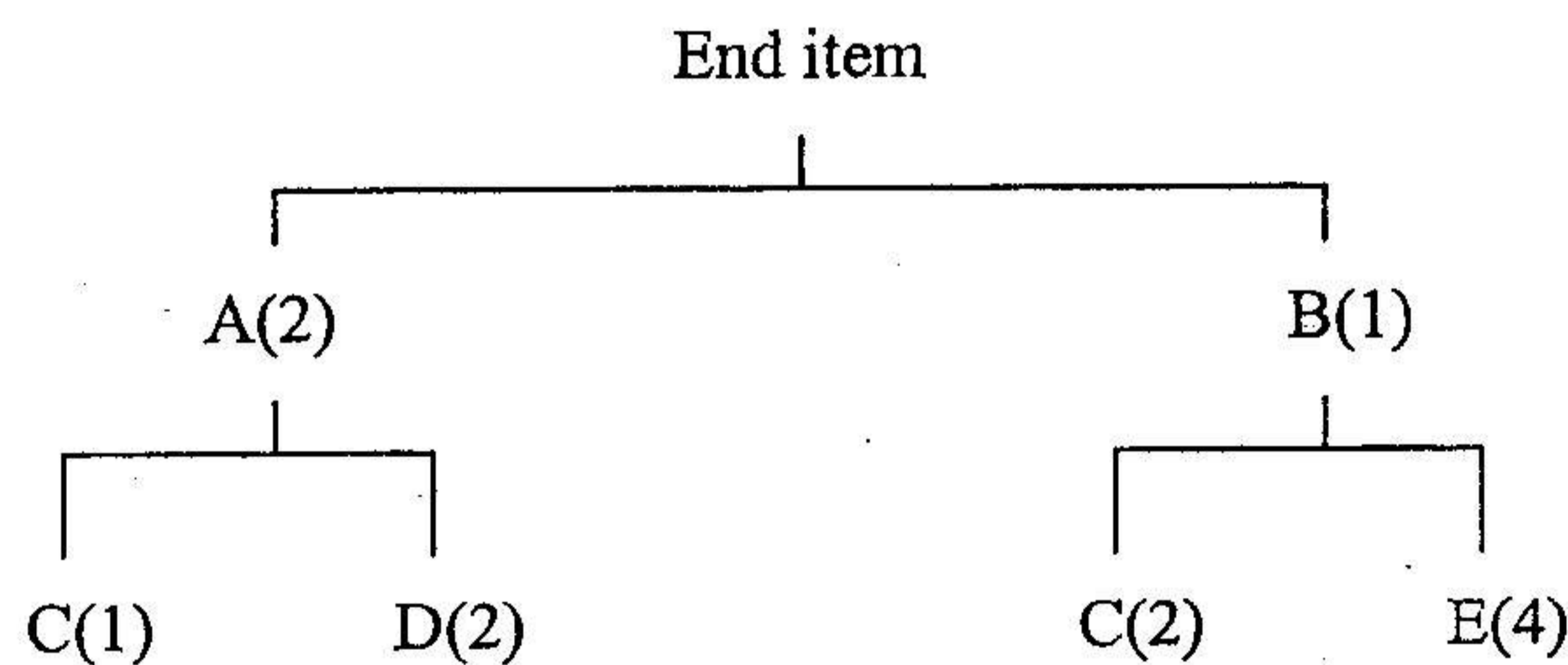
科目： 生產管制

用紙第 2 頁共 2 頁

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**Problem 3. (20%)** A firm buys 2,000 units of a product every year from a supplier. The order quantity is determined by the EOQ. The cost of placing an order is \$10. The price of purchasing one unit of the product is \$2. The cost of holding one unit of the product for one year is 50% of the purchase price. Recently, the supplier would like the firm to double its order quantity such that the supplier's production process can be made more efficient. In order for the firm to be willing to buy in larger quantity, the supplier has to offer a better purchase price for the firm. What should the new purchase price be so that it will be indifferent for the firm between the old EOQ at the old price (\$2 per unit) and the new order quantity (2EOQ) at the new price?

**Problem 4. (30%)** Consider the product structure tree and the master production schedule for the end item for weeks 7 through 10 shown as below. All items can be ordered or assembled using lot-for-lot ordering, except C. Component C can be purchased from supplier X and supplier Y. X is the primary supplier, but will not fill an order exceeding 300 units per week. If supplier X cannot provide all the required quantity of a particular week, the remaining amount will be purchased from supplier Y. Lead times of the end item and A are both 1 week. Lead times of B and C are both 2 weeks. The starting inventory of C in week 1 is 100 units. In addition, 50 units of C are expected to be received at the start of week 2.



Week	7	8	9	10
Net requirement	100	100	50	80

- (a) (20%) Determine the amounts of C that should be ordered from supplier X and Y in each week.
- (b) (10%) It is found that there is a 10% failure rate for component C purchased from supplier X and a 5% failure rate for component C purchased from supplier Y. A failed component cannot be used in the assembly of the end item. What quantities should be ordered from supplier X and Y in each week to compensate for this quality problem?