

國立臺北科技大學

九十三年年度工業工程與管理系碩士班入學考試

生產管理試題

填准考證號碼

第一頁 共二頁

--	--	--	--	--	--	--	--	--	--

注意事項：

1. 本試題共 5 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

1. A company is setting up an assembly line to produce product X by two eight-hour shifts, one is regular time shift, and another is overtime shift. Table 1 identifies the work elements, times, and immediate predecessors of product X. The demands of product X for the past four years are shown as Table 2. The relative production data about product X are shown in Table 3.
- (1) How to determine Cycle time of the assembly line? Using Ranked Position Weight Method (RPW) to balancing the assembly line and arrange the workstation. (Note: cycle time will affect capacity of the line and should fit the production plan) 15%
 - (2) To forecasting per period (quarter) demands of product X for year 2004. (Using simple average method for season factor) 10%
 - (3) To find the optimum production plan of product X for year 2004 and find the total cost. (Without backorder) 10%

Table 1.

Work Element	Time (Sec.)	Immediate predecessor(s)	Work Element	Time (Sec.)	Immediate predecessor(s)
A	4	-	F	1.5	B
B	8	A	G	12	A
C	3	D, E, F	H	14.5	G
D	2.5	B	I	13	H
E	2	B	J	11.5	C, I

Table 2.

Year	Units			
	Period 1 (quarter)	Period 2 (quarter)	Period 3 (quarter)	Period 4 (quarter)
2000	70000	130000	160000	100000
2001	80000	160000	170000	120000
2002	80000	180000	180000	140000
2003	90000	200000	210000	160000

Table 3.

- a. The working day of per period (quarter) is.....60 days
- b. The holding cost per unit per period (quarter) is.....\$1
- c. Regular time shift
- (a) Capacity per period (quarter).....from answer question (1)
 - (b) Allowance and downtime.....10%
 - (c) Efficiency.....90%
 - (d) Production cost per unit.....\$20
- d. Over time shift
- (a) Capacity per period (quarter).....from answer question (1)
 - (b) Allowance and downtime.....10%
 - (c) Efficiency.....60%
 - (d) Production cost per unit.....\$22
- e. Subcontract
- (a) Capacity per period (quarter).....30000
 - (b) Production cost per unit.....\$23
- f. The demands per period (quarter).....from answer question (2)

2. Four products are to be stored in the warehouse shown in Figure 1. The warehouse consists 24 storage bay, each storage bay is 10 ft × 10 ft. The docks of the warehouse are located in (20, 0) and (0, 20). Rectilinear travel occurs in the warehouse, with travel equally likely to be to/from each dock. The number of bays required for storage and the number of throughput (operations/per day) required for each product are shown as Table 4.
- (1) Determine the dedicated storage layout that will minimize the average distance traveled per day between the dock and the center of each storage bay. 10%
- (2) Suppose that randomized storage is to be used and the facility is unchanged from part (1). Determine the maximum number of storage bays required for storage of the aggregate product mix such that the expected distance traveled is no greater than that obtained in part (1). 10%

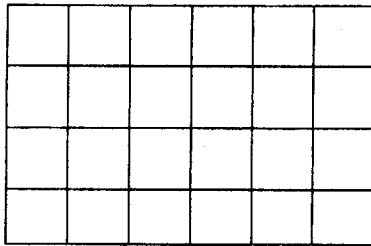


Figure 1. Warehouse layout

Table 4.

Product	Storage bays	Throughput (operations/day)
A	10	15
B	5	30
C	4	50
D	5	5

3. A job shop is setting up to produce product Y. Any job must be route from department 1 next to department 2 and finally to department 3. There are A, B, C, D, four jobs, the processing times (in days) for each job in each department are shown as Table 5.

- (1) To scheduling the four jobs and find the average flow time. (Using SPT) 10%
- (2) To plot the Gantt chart of the resulting. 10%

Table 5.

days

Job	Department1	Department2	Department3
A	8	2	4
B	5	4	5
C	6	1	3
D	7	3	2

4. Table 6 is a from-to chart of a small manufacturing firm. Arrange a flow line production to minimize the backtracking. 10%

Table 6.

From - to	Machine1	Machine 2	Machine 3	Machine 4
Machine 1	0	5	0	25
Machine 2	30	0	0	15
Machine 3	10	40	0	0
Machine 4	10	0	0	0

5. To describe the following question.

- (1) How to measure the performance of Production (Manufacturing or service) system 5%
- (2) Leveling production 5%
- (3) Cellular manufacturing 5%