

國立屏東科技大學 九十四 學年度 碩士班暨碩士在職專班招生考試
生產與作業管理 試題

注意：請一律使用試務中心提供的計算機

一、選擇題：共五題，每題十分，合計五十分。

每題選擇題有一個或多個正確的答案，請將正確答案的編號寫在答案卷。答錯不倒扣。

Case I

Sam Inc. produces electrical drills for major hardware stores. 10 basic tasks must be performed along the assembly line. The time to perform each task and the tasks that must be immediately preceding each task are listed in the following table.

Task	Task that immediately preceding	Time to perform task (minutes)
1	--	0.10
2	1	0.15
3	1	0.20
4	2、3	0.30
5	--	0.40
6	5	0.40
7	4、6	0.30
8	7	0.50
9	8	0.60
10	9	0.50

If 400 drills must be produced per hour by the assembly line, 50 minutes per hour are productive, and a maximum of three tasks can be combined into one workstation. Tasks are combined into workstations to minimize the idle time. According to Case I, please answer the following 2 questions.

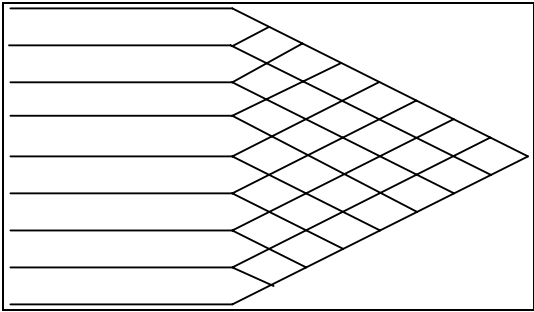
1. The cycle time (minutes per drill) is
 - (1). 0.150
 - (2). 0.125
 - (3). 0.600
 - (4). 0.100
 - (5). None of the above.

2. Which of the following statement(s) is (are) true ?
 - (1). The minimum number of workstations required is 27.6。
 - (2). Both of the incremental utilization heuristic and longest task-time heuristic can be used to assign tasks into workstation。
 - (3). 28 workstations are actually required。
 - (4). 29 workstations are actually required。
 - (5). There are 4 machines performing task 8。

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Case II

Wang’s Clinic is relocating a new one-floor office building. Dr. Wang, the director of the clinic, is in the process of deciding the location of each of the clinic’s eight functional entities based upon the closeness ratings. He wants to develop a layout that attempts to minimize the sum of the closeness ratings of adjacent areas. The closeness ratings of these functional entities are shown below.

Closeness rating	Meaning of rating	
A	Absolutely necessary	
E	Very important	
I	Important	
O	Ordinary importance	
U	Unimportant	
X	Undesired	

For simplicity, the floor space of the new office building is equally divided into eight areas as shown below:

3. According to Case II, which of the following layout is the most suitable layout for Dr. Wang’s new clinic?

(1).

D	Em	P	W
Ex	S	A	L

(2).

D	Ex	L	W
Em	S	P	A

(3).

D	Em	P	W
Ex	S	A	L

(4).

D	Ex	P	W
Em	S	L	A

(5). None of the above.

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Case III

Mr. Johnson is the general manager of Sam Inc. He is assigned to select one of the following four production systems to be installed in the new factory. The only information he has is listed in the following table.

Production system	Fixed cost per year	Variable cost per unit
I	\$2,500,000	\$11
II	\$1,000,000	\$30
III	\$1,500,000	\$20
IV	\$2,000,000	\$35

4. Based upon Case III, which of the following statement(s) is(are) true?
- (1). The break-even point of system II and III is 50,000 units per year.
 - (2). When the annual production quantity exceeds 200,000 units, system IV shall be selected.
 - (3). System III yields the lowest production cost when the annual production quantity is between 65,000 units and 100,000 units.
 - (4). System I yields the lowest production cost when the annual production quantity is between 100,000 units and 200,000 units.
 - (5). If marketing data indicates that the annual demand of Sam's product is between 120,000 units and 150,000 units, Mr. Johnson will select system I to ensure to yield the lowest production cost.
5. Which of the following statement(s) is(are) correct?
- (1). The volume flexibility is a firm's ability to quickly increase or reduce the quantity of products.
 - (2). Highly customized products are best suitable for job shop systems.
 - (3). Services can be inventoried, i.e., services can be produced before they are required.
 - (4). Automobiles are manufactured by continuous processing systems.
 - (5). All of the above.

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二、共五題，每題十分，合計五十分。

1. 某一種易腐性商品之市場需求量(X)服從均勻(uniform)分配，即 $X \sim U(100, 200)$ ，該商品在有效期間內每單位售價為 100 元，進貨成本為每單位 50 元，超過有效期限後則以每單位 20 元賣給下游加工業者(假設皆能以此價格全數銷售出去)，試問最適訂購數量為多少單位？
2. 某製造商生產一種產品，該產品之每日需求率為 100 單位，而該製造商每日之生產率為 500 單位，若該產品全年需求為 36000 單位(即假設全年為 360 天)，每次設置(setup)成本為 1000 元，該產品每單位每年之儲存成本為 10 元，試問經濟生產批量為何？每次生產期間多少天？
3. 某商品的每日需求量(X)服從常態(Normal)分配，即 $X \sim N(\mu=100, \sigma^2=100)$ ，該商品訂購之前置時間為 4 天，假設該商品之服務率設定為 95%(對應的 Z 值為 1.645)，試問安全存量為多少？再訂購點(reorder point)為多少？
4. 有 4 部機器及 3 個工作，其加工處理時間如下表所示：

		機器別			
		A	B	C	D
工 作 別	1	12	16	14	10
	2	9	8	13	7
	3	15	12	9	11

試問應如何指派以使總加工時間最小化？總加工時間為若干？

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5. 某一專案之作業時間及前置關係如下表所示：

作業名稱	後續作業	工作時間
A	C, B [*]	5
C	D	8
D	I	2
B	I	7
E	F	3
F	J	6
I	J	10
J	--	8
G	H	1
H	K	2
K	--	17

(*表示 A 作業完成之後，才能進行 C 與 B 作業)

試問要徑(critical path)為何?總完工時間為何?