

國立屏東科技大學 九十五 學年度 碩士班暨碩士在職專班招生考試  
生產與作業管理

注意：請一律使用試務中心提供的計算機

1. Explain the terms *robust design*, *modular design*, and *computer-aided design*. (10 分)
2. Explain the terms *central limit theorem*, *acceptable quality level*, and *average outgoing quality*. (10 分)
3. What is *cellular manufacturing*? What are its main benefits? (10 分)
4. (a) In terms of the strategic objective, how do industrial and service location decisions differ?  
(b) Explain the assumptions behind the center of gravity method. How can the model be used in a service facility location?  
(c) Use the following information to calculate the center of gravity.

Plant	$(X_i, Y_i)$	$W_i^*$
1	( 1, 3)	4
2	(10, 7)	6
3	( 3, 5)	8
4	( 2, 9)	10
5	( 7, 1)	2
6	( 4, 2)	5
7	( 9, 4)	1
8	( 8, 8)	7

\*  $W_i$  represents the weight of the  $i$ th plant. (15 分)

5. A time analyst observed a job for which work methods had just been changed. The job is divided into four work elements. The elements times (in minutes) for the six cycles are shown in the following table:

Element	1	2	3	4	5	6	Frequency	PR*
1	4.1	4.0	4.2	4.3	4.1	4.4	1.0	0.9
2	3.0		3.6		3.3		0.5	1.1
3	1.5	1.3	1.8	1.4	1.6	1.7	1.0	0.8
4	2.5	2.3	2.6	2.4	2.7	2.2	1.0	1.2

\*PR represents performance rating.

- (a) Calculate the normal time for the job.
- (b) Calculate the standard time for the job, assuming that the allowance is 15 percent which based on actual work time.
- (c) Determine the appropriate sample sizes if the estimate of time for any element is to be within  $\pm 5$  percent of the true mean time with 95 percent confidence. (15 分)

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6. 屏科公司某產品過去七個月的銷售量如下：

月份	1	2	3	4	5	6	7
銷售量(百件)	19	18	15	20	18	22	20

- (a) 以趨勢線  $\hat{Y}_i = a + bX_i$  並利用最小平方法預測 8 月份的銷售量。  
(b) 若平滑係數  $\alpha = 0.2$ ，且設 1 月份的預測銷售量等於實際銷售量，利用簡單指數平滑法預測 8 月份的銷售量。 (10 分)

7. 剛好即時(just in time)生產系統的最終目標(ultimate goal)為何？其支援目標為何(supporting goals)？並請分別從產品設計、製程設計、人事與組織、以及製造規劃與控制四個構面分項說明達成上述目標應有之相關作法。 (15 分)

8. 內埔公司某產品之單位售價(P)、與總成本(TC)如下所示：

$$P = 100 - 0.05Q$$

$$TC = 0.01Q^2 + 8Q + 20000$$

求(a)最大利潤時之銷售量；(b)損益平衡時之銷售量；(c)平均成本最低時之銷售量。

(15 分)