

國立臺灣科技大學 110 學年度碩士班招生試題

系所組別：工業管理系碩士班乙組

科目：生產管理

(總分為 100 分)

1. (10%) Use linear representation to develop a predictive model for demand for ironing board covers based on sales of irons.

Years	Sales of irons	Demand for covers
1	8	5
2	7	2
3	10	6
4	6	4

Please develop the linear equation of the prediction model.

(hint: $b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$ $a = \bar{y} - b\bar{x}$)

2. (20%) An investment proposal will have annual fixed cost of \$60,000, variable cost of \$35 per unit of output, and revenue of \$55 per unit of output.
- A. (10%) Determine the break-even quantity.
- B. (10%) What volume of output will be necessary for an annual profit of \$60,000?
3. (20%) Management wants to design an assembly line that will turn out 800 adult games per day. There will be eight working hours in each day. The industrial engineering staff has assembled the information as below:

Task	Time (min)	Immediate Predecessor
a	.2	none
b	.2	a
c	.4	none
d	.1	none
e	.3	c, d
f	.2	b, e
g	.1	none
h	.2	f, g
i	.6	h

- A. (10%) Determine the optimal cycle time.
- B. (10%) What is the minimum number of stations needed?



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4. (25%) Solve the following two-machine flow-shop scheduling problem.
 (1) Determine the optimum processing sequence for the jobs to minimize makespan and draw the Gantt chart. (15%) (2) Prove that your answer is optimal. (10%)

Task	Machine 1	Machine 2
a	9	3
b	2	5
c	4	8
d	7	1
e	10	6

5. (25%) A gas station use of oil is normally distributed with a mean of 8 tanks per day and a standard deviation of 1 tank per day. Lead time for delivery of the oil is 4 days. If the manager wants a service level of 99 percent (i.e., $z=2.33$), (1) What reorder point should be used? Explain your model for reorder point computation. (15%) (2) In addition to the random oil demand, given the lead time for delivery of the oil is stochastic and follows normal with a mean of 4 days and a standard deviation of 1 day, what reorder point should be used? And argue whether the prior reorder point is always equal or less than the latter one. (10%)

