

元智大學 103 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

- (20%) A company uses a particular type of machine to manufacture a product. The design capacity of the machine is 40 units per hour. Through a series of improvement activities, the manager is able to improve the effective capacity to 36 units per hour and the machine utilization to 85%. Annual demand for the product is estimated to be 200,000 units next year. The company operates 8 working hours per day and 250 workdays per year. In order to satisfy the predicted demand under these conditions, how many of this type of machine does the company need?
- (30%) Following is the current schedule for seven jobs to be processed in two work centers. The table shows the starting and finishing time of each jobs in the two work centers with the current job sequence. Each job must follow the same sequence, beginning with work center 1 and moving to work center 2. The manager is not pleased with the performance of this schedule and is trying to come up with a better schedule.

Job	Work Center 1		Work Center 2	
	Start	Finish	Start	Finish
A	7	11	11	17
B	11	20	20	28
C	20	30	30	35
D	30	36	36	45
E	36	44	45	52
F	44	56	56	66
G	56	58	66	69

- (5%) Prepare a schedule using SPT rule based on the processing times of jobs in work center 2.
- (10%) Determine a sequence by using Johnson's rule.
- (15%) Which one of the sequences in (a) and (b) has the better performance in terms of total flow time? Which sequence has smaller total idle time?

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3. (25%) Two forecasting methods are considered to be used for demand forecast of a product. The two methods are tested and compared using the product's actual sales from period 1 to period 9. The following table shows the results. Based on the data, which method would you recommend and why?

Period	1	2	3	4	5	6	7	8	9
Actual Sales	84	79	71	64	60	57	51	45	39
Method A	84	78	71	65	59	58	54	43	36
Method B	87	75	70	67	61	58	51	45	38

4. (25%) A company produces a chemical compound in lots at the rate of 250 units per hour. The chemical compound is used every day in the manufacturing process of the company's products at the steady rate of 50 units per hour. The company operates 8 hours per day and 5 days per week. Currently, the production lot size of the chemical compound is 2000 units and there is a setup cost of \$200 for each lot.
- (a) (15%) If the current production lot size is optimal, what weekly holding cost per unit does the lot size imply?
- (b) (10%) Suppose your answer to part (a) is presented to the manager, and the manager says that the weekly holding cost per unit should be higher. Would that mean the lot size is too large or too small and why?

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