

**National Examinations
May 2003**

**Production Management
Ind-A4**

Notes:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made;
2. Candidates may use one of two calculators, the Casio or Sharp approved models. This is a Closed Book exam.
3. Any **five** questions constitute a complete paper. Only the first five questions as they appear in your answer book will be marked.
4. All questions are equal value.

Q-1. A newspaper company consumes 10 tons of paper each month. The paper is currently replenished using an EOQ value of 10 tons. The EOQ value was computed assuming an interest rate of 24% per year. Assume that the current cost of each kg of paper is \$8.

- a) What is the order cost in determining the EOQ value?
- b) Suppose that the supplier offers a 5% Incremental Discount to the company for each order with an amount more than 15 tons. Should this offer be accepted? If yes, what would the savings be?

Q-2. SU Bakery in Toronto is a manufacturer of gourmet breads and other baked goods. The company purchases the flour and some other baking goods from several different suppliers located throughout Istanbul and have them shipped to Toronto via a cargo company. A wholesaler, Baker's Supply, located in Hamilton has made an offer to SU with new unit prices and offered a joint replenishment option that would cost \$850 per order. The unit purchase costs, order costs (including cargo fees), and annual demand quantities for the items are given as follows:

Item	Annual Demand	Current Unit Cost	Current Order Cost	New Unit Cost (Baker's Supp)
Flour	40,000 (kgs)	\$0.25/kg	\$100	\$0.3/kg
Yeast	900 (packages)	\$1.5 /package	\$220	\$2 / package
Oatmeal	800 (kgs)	\$0.69 / kg	\$200	\$0.89 / kg
Walnuts	2,800 (kgs)	\$1.2 /kg	\$140	\$1.5 /kg
Dried fruit	1,200 (kgs)	\$1.6 /kg	\$180	\$2.5 /kg
Cornmeal	15,000 (kgs)	\$0.45 / kg	\$100	\$0.7 / kg

Assuming an interest rate of 20% for the cost of capital, should SU accept Baker's Supply's offer?

Q-3. Consider the following jobs to be sequenced on a workcenter.

<u>Jobs</u>	<u>Processing Time</u>	<u>Due Date</u>
1	5	10
2	9	23
3	9	14
4	11	39
5	8	18
6	4	21

- a. Determine the sequence of jobs that minimizes mean lateness.
- b. Determine the sequence of jobs that minimizes the total number of tardy jobs.

Q-4. Consider the following demand: $D_1 = (45, 75, 105, 12, 50)$. The holding cost is \$2.00 per unit and the ordering cost is \$200.

- a. Determine the lot sizes using Silver-Meal heuristic.
- b. Determine the lot sizes using Part Period Balancing heuristic.
- c. Determine the optimal lot sizes using Wagner-Whitin algorithm.

Q-5. Explain briefly the following terms:

- a. Bill of Materials explosion
- b. System nervousness in MRP
- c. Flow shop
- d. Job shop
- e. Flow time

Q-6. Explain briefly the following terms:

- c. Flow shop
- d. Job shop
- e. Flow time
- f. Makespan
- g. Lateness
- h. Tardiness