

IEOR 150 Midterm 1

1. (9 points) A grocery store sells pepperoni. The whole sale price is \$2.00 per unit. The refrigerate shipment cost is \$250 per truck for up to 1000 pepperonis. It takes one week for the store to receive them. Annual holding cost rate is 40%.

- (a) How many pepperonis should the store have trucked in at one time, and how often should they order them? (3 points)
- (b) When should the store call the manufacturer to send a new shipment? (3 points)
- (c) Suppose the pepperonis sell for \$3.00 each. Are these pepperonis a profitable item for the store? If so, what annual profit can be expected to realize from this item? (Assume optimal inventory control policy is used) (3 points)

2. (6 points) A chips company produces two flavors of chips on the same machine. The demand and production information are as the following:

Flavor	annual demand	setup time	cost per unit	production rate
Original	200,000	5 hours	\$1.5	750/hour
Cheese	100,000	4 hours	\$1.6	250/hour

Holding cost is based on 20% annual interest rate and the products are to be produced in sequence on a rotation cycle. Worker's wage is estimated to be \$10 per hour.

- (a) What is the optimal time between setups for the Original chips? (3 points)
- (b) What are the optimal lot sizes of each flavor at optimal solution? (3 points)

3. (6 points) A store near Berkeley sells T-shirts. The annual demand is expected to be 6000. The supplier of the store has the following price schedule: A

- \$5.00 if purchase less than or equal to 2999
- \$4.75 if purchase greater or equal to 3000 and less than or equal to 5999
- \$4.5 if purchase greater or equal to 6000

The price per unit includes delivery. The manager estimates the administrative cost of processing an order to be approximately \$25, and the store uses an annual inventory holding cost rate of 50%. How many T-shirts should the manager order at each time?

4. (9 points) A microwave manufacturer uses approximately 500,000 units of a particular box for all their microwave products each year. The total production rate per day is normally distributed with a mean of 2000 and a standard deviation of 200. The company has a 250-day work year.

The packaging department monitors the inventory of boxes continuously. Each box costs \$3.00 and the administrative cost of each shipment is about \$200. The delivery time for boxes is 1 working day. The annual inventory holding cost rate is estimated to be 30%.

- (a) The company would like to package each microwave right after the production process is complete. The manager can only tolerate 1% chance of stocking out in each order cycle. What inventory control policy should be used? Please specify the parameters. (3 points)
- (b) If the manager changes her mind and thinks she wants to ensure that 98% of the microwaves are packaged immediately after completed. What inventory policy should be used? (Specify parameters) (3 points)
- (c) If approximately 3% of the microwaves would be damaged if not packaged immediately, what inventory policy should be used? (Specify parameters) (3 points)