Homework #4
Supply Chain Models: Manufacturing & Warehousing (ISyE 3104) – Fall 2002
Due September 26, 2002

Show all your work
Total **50** points

Question 1

A local company produces electric motors for several industrial clients. One particular type of electric motors has a constant demand of 3500 units per year. Each motor costs $3 to manufacture and the company uses an annual interest rate of 20%.

Initiating a production run costs $60 and the electric motors can be produced at a rate of 6000 units per year. Answer the following:

a) What is the optimal size of a production run for this particular electric motor? (10 points)

b) Find the time between initiation of production runs.

Find the time devoted to production and downtime in each production cycle.

What proportion of each production cycle consists of uptime and what proportion consists of downtime? (10 points)

c) What is the maximum inventory level?

What is the maximum dollar investment in electric motors the company has at any point of time? (5 points)

d) What is the total annual cost (holding + setup + production costs)? (4 points)

Assume that the electric motors are sold for $4.5 per unit, what is the annual profit the company is realizing from this particular type of electric motors? (1 points)

e) Currently, the time between each production run is 6 months.

What is the current annual cost? (Holding + setup costs)

Compare this annual cost with the optimal annual cost (Holding + setup costs) that you found in part c. (5 points)

Question 2

A communications firm requires hard discs (HD) for personal computers (PC). The firm estimates that the annual demand for HD's is 750. Order setup costs are $25 and holding costs are based on 25 % annual interest rate. Currently, unit purchasing cost of HD's is $3 and the firm is spending $2250 per year.

Discs Systems Co. is a new HD manufacturing company offering quantity discounts on the purchase of PC hard discs. If the order size is between 0 and 99, the company charges $3.5

per HD. If the order size is between 100 and 249, it charges $2.8, and if the order size is more than 250 each HD costs $1.5.

Do you think the communications company should consider buying the hard discs from Discs Systems Co.?

(15 points)