

Homework #7
Supply Chain Models: Manufacturing & Warehousing (ISyE 3104) – Fall 2002
Due October 17, at 12:05PM

Show all your work
Total **30** points

Question 1

The warehouse of a computer monitor manufacturing company stocks materials required for the monitor production. One particular type of materials, the capacitor, is purchased by the warehouse \$2.00 each. Order lead time is 1 month and the company uses an inventory carrying charge based on a 25% annual interest rate. The cost of order processing and receipt is \$70 per order. Annual demand for the capacitors follows a normal distribution with mean 100 and standard deviation of 15. Assume that if a capacitor is demanded when the warehouse is out of stock, then the demand is back ordered., and the cost associated with each backordered capacitor is \$5.

- a) The manager of the warehouse uses (Q,R) policy. Find the optimal values of the order quantity and the reorder level. (10 points)
- b) Determine the safety stock. (2 points)
- c) What are the average annual holding, setup and penalty costs associated with this item? (5 points)
- d) What is the cost of uncertainty? (Compare the total average annual cost you found in part (d) with the average annual cost that would be incurred if the lead time demand had a zero variance) (3 points)
- e) What is the proportion of order cycles in which no stock-outs occur? (2 points)
- f) What is the proportion of demand that is unmet? (3 points)

Question 2

Answer the following conceptual questions:

- a) Why is (Q,R) Policy more preferable than Multiperiod Newsboy Model in practice? (2 points)
- b) Which assumption of (Q,R) Policy might not hold in real life? (2 points)
- c) Which parameter used in calculating the optimal Q, R levels is the most difficult to estimate? (1 point)