MGTA 456

SAMPLE FINAL EXAM

This exam is open readings, class handouts and class notes. The Honor Code restrictions are as follows:

1. You must stop working on the exam immediately when "time's up" is announced. Failure to do so will result in failing the exam.
2. You must do this exam completely by yourself. This includes not discussing the exam with anybody else until all students have taken the exam.
3. You may consult your textbook, class handouts (including material from the class Canvas site), and class notes. Materials from Canvas must be downloaded before the exam starts (except downloading the data for the last question). You may use a calculator and/or laptop computer. *Using any email or instant messaging package will lead to failing the exam and hence the course.*
4. Write your answer in the space indicated. Show supporting calculations in the box below the question. Anything written outside these areas will not be considered during grading. Rambling qualitative answers and not giving quantitative answers in requested units will be penalized. *If you use R, Python and/or Excel, show the formula used on the exam so any mistakes can be tracked.*

This is a three hour version of the final exam. So, we may have a few more problems this year*

I acknowledge and accept the Honor Code and the restrictions outlined above:

NAME (print): .....

(sign): .....

Question 1 [10 points]

Growing asparagus is labor-intensive and thus expensive. At Wakefield Farms (WF), it is estimated that it costs 82 cents per pound for harvesting and another $1.48 per pound for cleaning and processing. WF sells asparagus through a distributor or at a farmers' market. The distributor pays $3.00 per pound and will take all the asparagus that WF offers. Asparagus sells for $4.25 per pound at the farmers' market but demand is uncertain (see the distribution below). Further asparagus unsold at the market is thrown out.

D	P(Demand=D)	P(Demand≤D)		D	P(Demand=D)	P(Demand≤D)		D	P(Demand=D)	P(Demand≤D)
50	5.1%	5.1%		**75**	6.5%	47.3%		**100**	3.3%	61.6%
55	7.4%	12.5%		**80**	4.3%	51.6%		**105**	10.2%	71.8%
60	9.5%	21.9%		**85**	2.8%	54.4%		**110**	15.9%	87.7%
65	10.0%	32.0%		**90**	2.0%	56.5%		**115**	9.8%	97.5%
70	8.8%	40.8%		**95**	1.8%	58.2%		**120**	2.5%	100.0%

It is the morning before the farmers' market and WF has just harvested and processed 120 pounds of asparagus. How many pounds should they bring to the farmers' market?

They should bring _____ pounds to the farmers' market.

Question 2 [10 points]

Matsuzaka Specialty Foods (MSF) distributes gourmet Japanese soy sauces. For one product, demand is 30 bottles a week (although there is variation in weekly sales). Because the lead time is 5 weeks, MSF has used a reorder point of 200 bottles, using a continuous review policy. The supplier has said that because of earthquake damage, it will now take 7 weeks to fill orders, causing the purchasing manager to change the reorder point to 260 bottles. *The cycle service level (i.e., the probability that all demand will be met during the cycle) will consequently*

Circle one: **INCREASE** **DECREASE** **STAY THE SAME**

Explain:

Question 3 [10 points]

On an average day University Photo Copying (UPC) uses 40 reams of plain white paper (a ream is 500 sheets of paper). They purchase reams for $7 per ream. UPC's supplier charges $56 to deliver an order regardless of the number of reams ordered and delivers an order four days after it has been placed.

a) UPC's annual cost of capital is 25%. How many reams should UPC order at a time? What are their annual inventory-related costs (i.e., holding and ordering costs)? (Assume 250 days per year.) [5 points]

UPC's optimal order is _____reams.

UPC's inventory costs are $ _____ per year.

b) UPC's usage of plain white paper is normally distributed and highly variable. The standard deviation of daily demand is 3.618 reams. What reorder point should they use to achieve a service level of 85% under the continuous review policy? What is the additional annual inventory related cost (i.e., on top of the costs you found in part a))? [5 points]

They should use a reorder point of _____reams.

The additional inventory-related costs are $ _____ per year.

Question 4 [10 points]

(a) A periodic review policy requires more safety inventory than a continuous review policy for the same cycle service level. [5 points]

Circle one: AGREE DISAGREE

Explain:

(b) Which of the following statement(s) is (are) true?
Circle the statement(s) that is (are) true. [5 points]

(i) Increasing the order frequency does not affect the safety inventory if a continuous review policy is followed.
(ii) Increasing the order frequency does not affect the safety inventory if a periodic review policy is followed.
(iii) Increasing the order frequency decreases the safety inventory if a continuous review policy is followed.
(iv) Increasing the order frequency decreases the safety inventory if a periodic review policy is followed.
(v) Increasing the order frequency increases the safety inventory if a continuous review policy is followed.
(vi) Increasing the order frequency increases the safety inventory if a periodic review policy is followed.

Explain:

Question 5 [15 points]

Mattel has traditionally allowed ToysRUs to place two orders to meet Christmas demand. The first order is placed by the 10th of November for delivery by Thanksgiving and the second order is placed by the 10th of December for delivery by December 17th. For 2017, Mattel has required all firms to place only a single order by November 10th for the entire season. Assume that ToysRUs targets a service level of 60%.

(a) As a result of the change in Mattel's policy, the total amount ordered by ToysRUs is expected to [5 points]

Circle One:

(i) Increase

(ii) Decrease

(iii) Remain unchanged

Explain why?

(b) As a result of the change in Mattel's policy, the total profit at ToysRUs is expected to [5 points]

Circle One:

(i) Increase

(ii) Decrease

(iii) Remain unchanged

Explain why?

(c) ToysRUs has two products which have the same coefficient of variation, which of the following statements is true? [5 points]

Circle One:

(i) If two products have the same coefficient of variation, they must hold the same number of days of safety inventory (irrespective of standard deviation), if they want the same CSL.

(ii) If two products have the same coefficient of variation, the product with the higher standard deviation must hold more days of safety inventory, if they want the same CSL.

(iii) If two products have the same standard deviation, they must hold the same number of days of safety inventory, if they want the same CSL.

Explain why?

Question 6 [20 points]

Cathy Hunt opened her new premium coffee roasting company called *Lofty* in Solana beach. She roasts her coffee only in the morning before opening the shop to sell during the day. All the leftovers by the end of the day are donated for free.

The first 50 days of data about the demand (pounds of coffee) are in TritonED (Final Exam folder). Cathy recognized that the demands are linearly increasing in time (days). Assume that the demands are Normally distributed.

She purchases her raw coffee from the global coffee trading company in Sorrento Valley at $3 per pound, and she sells the coffee at Lofty at $10 per pound after roasting. Cathy estimated that all of the variable costs associated with roasting amount to $1 per pound.

(a) Use the first 30 days of data and build the forecasting model for the demand. What is the forecast for t**he day 70**? [5 points]

The demand forecast for the day 70 is _____ pounds of coffee.

(b) On the day 70, Cathy plans to have 30 pounds of coffee as a leftover, on average. What will be the service level on the day 70? [5 points]

The service level for the day 70 will be _____ %.

(c) On the day 70, what will be the optimal pounds of coffee to roast? [10 points]

Cathy should roast _____ pounds of coffee at the day 70.