UNIVERSITY OF SWAZILAND

FACULTY OF COMMERCE

DEPARTMENT OF BUSINESS ADMINISTRATION

MAIN EXAMINATION 2012

FULL-TIME AND I.D.E.

TITLE OF PAPER : OPERATIONS MANAGEMENT

COURSE : BA 513

DEGREE AND YEAR :BCOM 5/ IDEBCOM 7

TIME ALLOWED :THREE (3) HOURS

INSTRUCTIONS:

1. **THIS PAPER CONSISTS OF SECTIONS (A) AND (B)**
2. **SECTION (A) IS COMPULSORY**
3. **ANSWER ANY THREE (3) QUESTIONS FROM SECTION B**
4. **THE TOTAL NUMBER OF QUESTIONS IN THIS PAPER IS FIVE**
5. **WHERE APPLICABLE, ALL WORKINGS/ CALCULATIONS MUST BE CLEARLY SHOWN**

NOTE: MARKS WILL BE AWARDED FOR GOOD COMMUNICATION AND FOR ORDERLY PRESENTATION

THIS EXAMINATION PAPER SHOULD NOT BE OPENED UNTIL INVIGILATOR HAS GRANTED PERMISSION

SECTION A (COMPULSORY)

READ THE FOLLOWING CASE AND ANSWER THE QUESTIONS BELOW

Inventory Management at Flame Electronics

Inventory management in some operations is more than just a part of their responsibility; it is their very reason for being in business. Flame Electrical, South Africa's largest independent supplier and distributor of lamps, is such a business. It stocks over 2900 different types of lamp, which are sourced from 14 countries and distributed to customers throughout the country.

'In effect our customers are using us to manage their stocks of lighting sources for them,' says Jeff Schaffer, the Managing Director of Flame Electrical. 'They could, if they wanted to, hold their own stock but might not want to devote the time, space, money or effort to doing so. Using us they get the widest range of products to choose from, and an accurate, fast and dependable service.'
Central to the company's ability to provide the service its customers expect is its computerized stock management system. The system holds information on all of Flame's customers, the type of lamps they may order, the quality and brand of lamps they prefer, the price to be charged and the location of each item in the warehouse. When a customer phones in to order, the computer system immediately accesses all this information, which is confirmed to the customer. This leaves only the quantity of each lamp required by the customer to be keyed in. The system then generates an instruction to the warehouse to pick up and dispatch the order. This instruction includes the shelf location of each item. The system even calculates the location of each item in the warehouse which will minimize the movement of stock for warehouse staff.

Orders for the replenishment of stocks in the warehouse are triggered by a re-order point system. The re-order point is set for each stocked item depending on the likely demand for the product during the order lead time (forecast from the equivalent period's orders the previous year), the order lead time for the item (which varies from 24 hours to four months) and the variability of the lead time (from previous experience). The size of the replenishment order depends on the lamp being ordered. Flame prefers most orders to be for a whole number of container loads (the shipping costs for part-container loads being more expensive). However, lower order quantities of small or expensive lamps may be used. The order quantity for each lamp is based on its demand,

its value and the cost of transportation from the suppliers. However, all this can be overridden in an emergency. If a customer, such as a hospital, urgently needs a particular lamp which is not in stock, the company will even use a fast courier to fly the item in from overseas – all for the sake of maintaining its reputation for high service levels.

'We have to get the balance right,' says Jeff Schaffer. 'Excellent service is the foundation of our success. But we could not survive if we did not control stocks tightly. After all we are carrying the cost of every lamp in our warehouse until the customer eventually pays for it. If stock levels were too high we just could not operate profitably. It is for that reason that we go as far as to pay incentives to the relevant staff based on how well they keep our working capital and stocks under control.'

Question 1

a) Define what the five performance objectives (quality, speed, dependability, flexibility and cost) mean for an operation such as Flame Electrical. **(15 marks)**

c) What seems to influence the stock replenishment policy of Flame Electrical? **(5 marks)**

d) How does this differ from conventional economic order quantity theory? **(5 marks)**

SECTION B (ANSWER ANY THREE QUESTIONS)

QUESTION 2

Ikizler A.S. wants to enter the Latex Mattress market in Turkey. In order to learn how big is the market they want to estimate (forecast) the demand in 2008. They collect the following data and would like to forecast the demand for the first quarter of 2008 using different time series methods:

Time	1	2	3	4	5	6	7	8
Sales (in 1000's)	200	300	180	220	220	320	180	250

Note that : 2006 Quarter1 as t=1, 2006 Quarter2 as t=2 and ...2007 Quarter4 as t=8. Therefore the time period to be forecasted, 2008 Quarter1 is t=9.

a) Calculate the F9 (forecast for 2008 Quarter 1) using the following three time series methods: Naive, Moving average with n = 0.4, and Exponential Smoothing $\alpha = 0.8$. **(9 MARKS)**

b) Calculate MAD for each of the forecasting methods. **(6 MARKS)**

c) Calculate MAPE for each of the forecasting methods. **(6 MARKS)**

d) Which forecasting method (Naive, Moving Average or Exponential Smoothing) do you recommend to Ikizler A.S.? **(4 MARKS)**

QUESTION 3

A company manufactures three styles of calculators. The basic calculator has a forecast demand of 5200 per year and costs E10. The setup cost for the basic calculator is E120 and the holding cost in E1.50 per year. Basic calculators can be produced at the rate of 150 per day. Assume 260 days per year.

a) How many basic calculators should be produced in each production run? **(5 MARKS)**

b) How long is each production run of basic calculators? **(5 MARKS)**

c) How many production runs per year are there for the basic calculator? **(5 MARKS)**

d) What is the total annual cost for the basic calculators? **(5 MARKS)**

e) How long is the time between the beginnings of two subsequent production runs of basis calculators? **(5 MARKS)**

QUESTION 4

Telephone calls arrive at a computer help desk at the rate of 24 per hour. Currently, the help desk has one worker and the average call requires 2 minutes for the worker. Calls that arrive while the worker is on the phone (answering an earlier call) are put on hold and answered in the order received.

a) How long does the average caller wait on hold, and how many calls are on hold on average? **(8 MARKS)**

b) How many phone calls per 8 hour day will arrive when at least 3 other calls are in the system? **(4 MARKS)**

c) If a second worker is added (who also requires on average 2 minutes per call), how long does the average caller wait on hold and how many calls are on hold on average? **(8 MARKS)**

d) If help desk workers are paid $9/hour, how large would the callers waiting cost per hour have to be to make the two worker system less expensive than the one worker system? **(5 MARKS)**

QUESTION 5

A product design team has two options for a new product: high technology and low technology. The low technology option will cost E500,000, and the probability of the product becoming obsolete in the near future is 0.4. (The probability of the product not becoming obsolete is 0.6.) The high technology option will cost E1,500,000, and the probability of the product becoming obsolete in the near future is 0.3. (The probability of the product not becoming obsolete is 0.7.) If the low tech option is selected and the product becomes obsolete, then it may be either scrapped at a cost of E150,000 or sold in a secondary market for a total revenue of E400,000. A low tech product that does not become obsolete will produce a total revenue of E800,000. A high tech product that becomes obsolete will provide a total revenue of E600,000. A high tech product that does not become obsolete will provide a total revenue of E2,200,000. Use a decision tree to determine the course of action and the resulting expected value. Show the decision tree and all your work.

(25 MARKS)