UNIVERSITY OF SWAZILAND

FACULTY OF COMMERCE

DEPARTMENT OF BUSINESS ADMINISTRATION

FINAL EXAMINATION PAPER

MAY 2005

TITLE PAPER	:	PRODUCTION/OPERATIONS MANAGEMENT
COURSE TITLE	:	BA 513
TIME ALLOWED	:	THREE (3) HOURS
INSTRUCTIONS	:	(1) TOTAL NUMBER OF QUESTIONS IN THIS PAPER IS SIX (6)
		(2) THE PAPER CONSISTS OF SECTION A AND SECTION B.
		(3) ANSWER ANY TWO (2) QUESTIONS FROM EACH SECTION.
		(4) THE MARKS AWARDED FOR A QUESTION /PART OF A QUESTION ARE INDICATED AT THE END OF EACH QUESTION / PART OF QUESTION.
		(5) ALL WORKINGS MUST BE CLEARLY SHOWN

NOTE: MAXIMUM MARKS WILL BE AWARDED FOR GOOD QUALITY LAYOUT, ACCURACY, AND PRESENTATION OF YOUR WORK.

THIS PAPER MUST NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR.

!!!GOOD LUCK!!!

SECTION A (Answer any two questions).

Q1 (a). A manufacturing company has conducted a time study for ten cycles of a job. The job has five elements and the total elemental times (minutes) for each element and performance rating factors are as follows:

Element	$\sum t$(min)	***RF***
1	3.61	1.05
2	4.84	0.90
3	2.93	1.00
4	4.91	1.10
5	1.78	0.95

Compute the ***standard time*** using an ***allowance factor*** of ***18%.*** (5marks).

(b). From ***'question a'***, determine the ***sample size "n"*** for a time study so there is ***98% confidence*** that the average time computed from the time study is ***within 4%*** of the ***actual average cycle time***. The sample standard deviation is ***0.23***. (5marks).

(c). ***Discuss*** the ***three major categories*** of the ***elements of job design***. (15marks).

Q2. PM Computer Services assembles customized personal computers from generic parts. Formed and operated by part-time ***IDE*** students – Tom and Jerry. The company assembles computers mostly at night, using part-time students. Tom and Jerry purchase generic computer parts in volume at a discount from a variety of sources whenever they see a good deal. Thus, they need a good forecast of demand for their computers so that they will know how many computer component parts to purchase and stock.

The company has accumulated the demand data shown in the accompanying table for its computers for the past twelve months, from which it wants to consider ***exponential smoothing*** forecasts using ***smoothing constants*** (α) equal to 0.30 and 0.50.

Demand for Personal Computers

Period	***Month***	***Demand***	***Period***	***Month***	***Demand***
1	January	37	7	July	43
2	February	40	8	August	47
3	March	41	9	September	56
4	April	37	10	October	52
5	May	45	11	November	55
6	June	50	12	December	54

Required:

(a). Develop the forecast for the company. (15marks).

(b). Plot the graph showing the forecast and the actual for the period. (10marks).

Q3. Four plant locations are under consideration for a new microchip plant. Here are estimates of the fixed and variable costs at each location.

Location	***FC/year***	***VC/unit***
A	E3, 500,000	E600
B	3, 000,000	800
C	4, 000,000	500
D	4, 500,000	400

Required:

(a). What is the total cost function for each location? (4marks).

(b). Plot the total cost functions for these locations on the same graph. (8marks).

(c). On the graph, identify the range of output for which each location has the least cost. (4marks).

(d). Which location should be selected for an output of ***(i)*** 4,000 and ***(ii)*** 12,000 chips per year? (4marks).

(e). Find the cutoff points algebraically. (5marks).

SECTION B (Answer any two questions).

Q4(a). The manager of a store that sells office supplies has decided to set an annual service level of 96% for a certain model of telephone answering equipment. The store sells approximately 300 of this model a year. Holding cost is E5 per unit annually, ordering cost is E25, and δ_{dLT} = 7.

(i). What average number of units short per year will be consistent with the specified annual service level? (3marks).

(ii). What average number of units short per cycle will provide the desired annual service levels? (6marks).

(iii). What lead-time service level is necessary for the 96% annual service level? (6marks).

(b). A lab orders a number of chemicals from the same supplier every 30days. Lead-time is 5days. The assistant manager of the lab must determine how much of one of these chemicals to order. A check of stock revealed that eleven 25-ml jars are on hand. Daily usage of the chemical is approximately normal with a mean of 15.2ml per day and a standard deviation of 1.6ml per day. The desired service level for this chemical is 95%.

(i). How many jars of the chemical should be ordered? (6marks).

(ii). What is the average amount of safety stock of the chemical? (4marks).

Q5 (a). Why should any organization ***switch from making to buying***? (13marks).

(b). What are the limitations of ***Incoterms?*** (12marks).

Q6. Swazi Airline is planning to open satellite ticket desk in a new shopping plaza, staffed by one ticket agent. It is estimated that requests for tickets and information will average 15 per hour; and request will have a Poisson distribution. Service time is assumed to be exponentially distributed. Previous experience suggests that mean service time average 3minutes per request.

160

Required:

(a). Calculate the system utilization . (4marks).

(b). Percentage of time the server will be idle. (2marks).

(c). The expected number of customers waiting to be served. (5marks).

(d). The average time customers will spend in the system. (5marks).

(e). The probability of zero customer in the system and the probability of 4 customers in the system. (9marks).