UNIVERSITY OF SWAZILAND

FACULTY OF COMMERCE

DEPARTMENT OF BUSINESS ADMINISTRATION

FINAL EXAMINATION PAPER

MAY, 2008

(FULL TIME / IDE STUDENTS).

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

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

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

Q1. Swazican, Inc., produces bottled pickle juice. A planner has developed an aggregate forecast for demand (in cases) for the next six months.

Month	May	June	July	August	September	October
Forecast	4000	4800	5600	7200	6400	5000

Use the following information to develop aggregate plans.

Regular production cost	E10 per case.
Regular production capacity	5000 cases.
Overtime production cost	E16 per case.
Subcontracting cost	E20 per case.
Holding cost	E1 per case per month.
Beginning inventory	0

Develop an aggregate plan using each of the following guidelines and compute the total cost for each plan.

(a). Use level production supplemented with overtime as needed.   (15marks).

(b). Use a combination of overtime (500 cases per period maximum), inventory, and subcontracting (500 cases per period maximum) to handle variations in demand.
                                                                                   (15marks).

(c). Use overtime up to 750 cases per period and inventory to handle variations in demand.   (15marks).

(d). Which plan has the lowest total cost?   (5marks).

Q2. Sharp, a large electronics manufacturer, assembles mode EL-506W hand-held calculators at its Midrand, South Africa. The assembly tasks that must be performed on each calculator are shown below. The parts used in this assembly line are supplied by materials-handling personnel to parts bins used in each task. The assemblies are moved along by conveyors belt between work stations.

Task:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Preceding task:	-	A	A	A	B,C,D	E	F	G	H	I	J	J	K,L	M	N
Task time (minutes):	0.18	0.12	0.32	0.45	0.51	0.55	0.38	0.42	0.30	0.18	0.36	0.42	0.48	0.30	0.39

Assuming that 54 minutes per hour are productive. If 540 calculators must be produced by this assembly line per hour: then,

(a). Compute the cycle time per calculators in minutes.   (3marks).

(b). Compute the minimum number of work stations.   (4marks).

(c). How would you combine the tasks into work stations to minimize idle time?
    Evaluate your proposal.   (15marks).

(d). Compute the efficiency of your proposal.   (3marks).

Q3(a). A production process consists of a three-step operation. The scrap rate is 10% for the first step and 6% for the other two steps.

(i). If the desired daily output is 450 units, how many units must be started to allow for loss due to scrap?   (5marks).

(ii). If the scrap rate for each step could be cut in half, how many units would this save in terms of the scrap allowance?   (5marks).

(iii). If the scrap represents a cost of E10 per unit, how much is it costing the company per day for the original scrap rate?   (5marks).

(b). An appliance manufacturer wants to contract with a repair shop to handle authorized repairs in Matsapha. The company has set an acceptance range of repair time of 50 minutes to 90 minutes. Two firms have submitted bids for the work. In test trials, one firm has a mean repair time of 74 minutes with a standard deviation of 4.0 minutes and the other firm has a mean repair time of 72 minutes with a standard deviation of 5.1 minutes. Which firm would you choose? Why?   (10marks).

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 $\delta_{dLT} = 7$.

(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). In a job shop, effective capacity is only 50% of design capacity, and actual output is 80% of effective output. What design capacity would be needed to achieve an actual output of 8 jobs per week? (15marks).

(b). A company manufactures a product using two machine cells. Each cell has a design capacity of 250 units per day and an effective capacity per day and an effective capacity of 230 units per day. At present, actual output averages 200 units per cell, but the manager estimates that productivity improvements soon will increase output to 225 units per day. Annual demand is currently 50,000 units. It is forecasted that within two years, annual demand will triple. How many cells should the company plan to produce to satisfy predicted demand under these conditions? Assume 240 workdays per year. (10marks).