JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

(KISUMU LEARNING CENTRE)

UNIVERSITY EXAMINATIONS APRIL 2013

DEGREE OF THE BACHELOR OF BUSINESS ADMINISTRATION

COURSE: QUANTITATIVE METHODS IN BUSINESSII

COURSE CODE ABA 402:

DATE …….. **TIME: ……..**

INSTRUCTIONS:

1. **Attempt any FOUR questions**
2. **All questions carry the same marks**

Q1 a) Explain Monte Carlo simulation process and state FOUR areas of application in management and manufacturing processes (6 marks)

b) Simkin hardware sells Ace Electric drill model whose daily demand is relatively low but subject to some variability. Over the past 300 days Simkin has observed the sales shown in **Table1**.On the opening sales day of 1st February, 2013, the hardware had a stock of 10 drills, the reorder point is 5, that is every time the on-hand inventory at the end of the day is5 or less; Simkin will call his supplier that evening to place an order of 10 drills. If the lead time is 1 day, the order will not arrive the next morning but at the beginning of the following day.

Table 1. ***Daily Ace drill demand***

Demand for Ace drills	0	1	2	3	4	5	Total
Frequency	15	30	60	120	45	30	300 days

Simulate the process for the ten days period and establish;

i) Mean ending inventory per day

ii) Mean lost in sales per day (6 marks)

c) In Question (a), if Simkins estimates that the cost of placing an order is Kshs 10.00 , the holding cost per drill is Kshs s 0.50 and the cost of lost sales is Kshs 8.00. Calculate

i) Daily order cost
ii) Daily holding cost
iii) Stock out cost
iv) Total daily inventory cost (8 marks)

Q2. a) Kaluma service station has five mechanics that services scooters in 2 hours, the scooters are registered in a single station then sent for servicing to different mechanics. The scooters arrive at an average of 2 scooters per hour. Assuming the scooter arrivals are poison distributed and the servicing time are exponentially distributed. Determine:

i) The expected number of scooters waiting in the queue.

ii) Expected waiting time in the queue.

iii) The time the scooters take in the service system. (10 marks)

b) Suppose that the manager of the service station question (a) is considering to engage two more mechanics in the service station, advice whether the idea is economical if the cost of customers waiting in the system is costed at Kshs 120.00 per customer per hour, while each mechanic is to be paid Kshs 60.00 per hour. Use the table to obtain the probability of thre being an idle time in the facility (Po) (10 marks)

Q3. a) Komala plumbing works manufactures bath tabs in several of its factories situated in the following areas; Kericho, Busia and Kisii. The factories supplies the three of its warehouses situated in Machakos, Eldoret and Kisumu. The relevant data on cost in Kenya shillings and capacity is given in **Table2.**

Table 2.

Factories	**Machakos**	**Eldoret**	**Kisumu**	**Factory capacity**
Kericho	50	40	30	100
Busia	80	40	30	300
Kisii	90	70	50	300
Demand in tons	300	200	100	**700**

Using the North West corner rule determine the following:

i) The routes that will result into optimal cost of shipping.

ii) The minimum transport cost of shipping the bath tabs to the various warehouses in Kenya shillings. (20 marks)

Q4. A firm produces three products XY and Z with contributions of £20, £18 and £16 respectively, the production data is given in **table 2.**

Table 3.

Products	**Machine Hours**	**Labour hours**	**Materials in Kgs**
X	5	2	8
Y	3	5	10
Z	6	3	3
Total hours available	**3000**	**2500**	**10000**

Required:

i. Formulate the problem as an LPP and determine the optimal production schedule for this firm using simplex method.

ii. If a product is not to be produced explain the effect of its production on the overall profit maximization. (20 marks)

Q5. In the following data, the experience of machine operators and their performance rating as given by the number of good parts turned out per 100 pieces is listed.

Operator:	1	2	3	4	5	6	7	8
Experience (years):	16	12	18	4	3	10	5	12
Performance rating:	87	88	89	78	78	80	75	82

Required;

i) Obtain the regression equation of performance rating on experience.

Ii) Use the equation to estimate the probable performance if an operator has 10 years. (20 marks)

Q6. The following cost matrix is given for a machine shop that produces parts for sugar factories in western Kenya as illustrated in **Table 4.**

		Job			
Machinist	1	2	3	4	5
A	10	3	3	2	8
B	9	7	8	2	7
C	7	5	6	2	4
D	3	5	8	2	4
E	9	10	9	6	10

Required; Determine:

i) The optimal job assignment
ii) The cost of assignment (20 marks}

END! THANK YOU.