KABARAK   **UNIVERSITY**

EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: **BMGT 410**

COURSE TITLE: **OPERATIONS RESEARCH**

STREAM: **Y4S1**

DAY: **TUESDAY**

TIME: **8.30-10.30 A.M.**

DATE: **16/12/2008**

INSTRUCTIONS:

1. Answer question one and any two other questions
2. Show your workings clearly.
3. Do Not write anything on this question paper
4. Read instructions on the answer booklet carefully.
5. Graph papers are provided.

PLEASE TURN OVER

QUESTION ONE (COMPULSORY)

(a) "Operations researchers normally start with a simple model and subsequently develop it into elaborate one to reflect the reality of the problem"
   (i)   Do you agree with this statement? Explain   (**6 marks**)
   (ii)   How is a model simplified   (**4 marks**)

(b) Managers, as decision makers can purchase computer software to solve specific Operations Research (OR) formulations and as such it is not important for them to learn the OR techniques. Comment on this statement   (**5 marks**)

(c) Briefly distinguish between the Economic Order Quantity (EOQ) and the Economic Batch Quantity (EBQ) models as used in inventory management   (**4 marks).**

(d) Precisely explain each of the following terminologies as used in Linear Programming
   (i)   Decision Variable   (**2 marks**)
   (ii)   Surplus variable   (**2 marks**)
   (iii)   Basic Variable   (**2 marks**)
   (iv)   Alternate Solution   (**2 marks**)
   (v)   Duality Principle   (**2 marks**)

(e) Simulation doesn't provide optimal solution. Comment on any three situations when OR analysts would consider using simulation to solve management problems   (**6 marks**)

QUESTION TWO

(a) What are the basic decisions that a manager with stock control responsibility faces and what are the likely objectives of such a manager in this context.   (**6 marks**)

(b) The demand rate of a particular item is 12,000 units per year. The set up cost per run is Ksh. 350 and the holding cost is Ksh. 0.20 per unit per month. If no shortages are allowed and the replacement is instantaneous, determine

   (i)   The optimum run size   (**4 marks**)
   (ii)   Minimum total expected annual cost   (**5 marks**)

(c) A T.V technician finds that the time spent on his jobs has an exponential distribution with mean 30 minutes, if he repairs sets in the order in which they come in. If the arrival of sets is approximately Poisson with an average rate of 10 per 8-hour day, what is the repairman's expected ideal time each day?   (**5 marks**)

QUESTION THREE

a. A wholesale company has three warehouses from which suppliers are drawn for four retail customers. The company deals in a single product, the suppliers of which at each warehouse are:-

Warehouse	Supply (tons)
1	20
2	28
3	17

Customer	Demand tons
A	15
B	19
C	13
D	18

The following table gives the transportation costs per ton shipment from each warehouse to each customer

Customer

Warehouse	A	B	C	D
1	Sh 30	60	80	50
2	60	10	20	50
3	70	80	30	90

Obtain an initial feasible solution using
   (i)   North west corner rule
   (ii) Least cost cell method
   (iii) Vogels approximation method and comment on the solutions **(10 marks)**

(b) A truck owner finds from his records that the maintenance costs per year of a truck whose purchase is Kshs. 800,000 are given below:

YEAR	1	2	3	4	5	6	7	8
Maintenance Costs	100,000	130,000	170,000	220,000	290,000	380,000	480,000	600,000
Resale Value	400,000	200,000	120,000	60,000	50,000	40,000	40,000	40,000

Determine the time at which it is profitable to replace the truck   **(10 marks)**

QUESTION FOUR

a)   The following time-cost table (time in weeks and cost in Ksh.) applies to a project.

Activity	Normal		Crash	
	Time	Cost	Time	Cost
1-2	2	800	1	1400
1-3	5	1000	2	2000
1-4	5	1000	3	1800
2-4	1	500	1	500
2-5	5	1500	3	2100
3-4	4	2000	3	3000
3-5	6	1200	4	1600
4-5	5	900	3	1600

Required:

   (i)   Draw a network diagram to represent the information   **(4 marks)**
   (ii)   Determine the critical path, expected project time and normal cost   **(6 marks)**
   (iii)   Determine the minimum project time and cost   **(6 marks)**

(b)   Differentiate between Critical Path Method (CPM) and Programme Evaluation and
       Review Technique (PERT).   **(4 marks)**