KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: BMGT 410

COURSE TITLE: OPERATIONAL RESEARCH

STREAM: Y4S1

DAY: TUESDAY

TIME: 9:00 – 12:00 P.M.

DATE: 16/03/2010

INSTRUCTIONS:

1. Read instruction on the answer booklet carefully
2. The paper contains FOUR questions
3. Answer question ONE and ANY OTHER TWO questions
4. Do not write anything on this question paper
5. Graph papers are provided

PLEASE TURNOVER

QUESTION 1

a) Operations Research normally starts with a simple model and subsequently develops it into an elaborate one to reflect the reality of the problem.
   Briefly explain this statement. (5 marks)
b) Explain what is meant by "problem oriented" in operations. Research context. (5 marks)
c) Explain the importance of Linear Programming in Business and Industry. (5 marks)
d) Explain the following terms as used in inventory management/control.
   (i) Fixed Re-order stock level system.
   (ii) Fixed Time interval Re-ordering system
   (iii) Economic order Quantity.(6 marks)
   } (6 marks)
e) Clearly distinguish between Progrmme Evaluation and Review Technique Theory.
   (i) Poisson arrival and exponential services
   (ii) Bulking customer and jockeying customer. (5 marks)

QUESTION 2

Menengai Automobiles Inc. manufactures a 1500cc and 2000cc motorcycles. Each 1500cc motorcycles earn a profit of Ksh. 3700 and each 2000cc. motorcycle earns a profit of Ksh. 3600. Manufacture of these motorcycles involves three Key processes. The hours required for each process and the hour are shown in the table below.

process	Hours required per motorcycle in each process		Hours available per month
	1500 cc	2000 cc	
Motorcycle Assembly	600	1,200	9000
Component Manufacture	300	300	3000
Engine shop	900	0	6,300

Required:

a) Formulate the above as an LP problem and solve the product mix problem using the graphical method. (12 marks)
b) Describe the dual problem from the above and set up an initial simplex table. (8 marks)

QUESTION 3

a) The Tough kind's computers Inc. purchase 6000 hard drives per year for use in these computers. Each order cost Ksh. 80. The inventory holding cost is 10% of the units. Price. The supplier has provided the following price list.

Order Quantity	Price per unit
1 – 499	Ksh. 50.00
500 – 649	Ksh. 45.00
650 +	Ksh. 42.50

Assuming instantaneous delivery, determine the optical quantity order. (10 marks)

b) Determine the age at which the following types of machine be replaced.

Cost price = Ksh.8000

Operating cost = Ksh.1000 for the first year, increasing by Ksh. 500 every year.

Resale value = Khs.4000 for the first year decreasing by Ksh.500every year. (10 marks)

QUESTION 4

a) A project consist of nine jobs (A,B,C,D,E,F,G,H and I) with the following precedence

Immediate estimated time (in days)				
	Job Predecessor(s)	Optimistic Time To	Most likely Time Tm	Pessimistic Time Tp
A	-	3	6	15
B	-	2	5	14
C	A,B	6	12	30
D	A,B	2	5	8
E	B	5	11	17
F	D,E	3	6	15
G	C,F	3	9	27
H	D,E	1	4	7
I	G,H	2	5	8

(i) Draw the project network. (4 marks)

(ii) Determine the critical path and the expected project time. (5 marks)

(iii) Determine the probability that the project will be completed four days earlier. (5 marks)

b) Describe the four components of a queving system. (6 marks)