

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: WEDNESDAY

TIME: 4:00 – 6:00 P.M.

DATE: 07/03/2010

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 distinctive approach is to develop a scientific model of the system incorporating measurement of factors such as chance and risk with which to predict the outcome of alternatives decisions, strategies and control.
- (i) Explain the importance of models in an or project. (3 marks)
 - (ii) Explain the essential characteristics of Operations Research. (3 marks)
- b) Linear programming is a major optimization tool in modern managerial decisions. Discuss this statement citing its limitation in various areas of application. (5 marks)
- c) Explain the reasons why an organization has to maintain some level of inventory. (5 marks)
- d) Network analysis has gained popularity in project management in recent times to the extent that it is incorporated in every decision involving projects. Explain how practicing managers are network diagrams. (5 marks)
- e) Briefly describe the concept of replacement theory in an organization. (5 marks)
- f) Differentiate between queuing and simulation citing examples in each case. (4 marks)

QUESTION 2

- a) A baker makes two products, Large loaves and small round loaves. He can sell up to 280 of the large loaves and up to 400 of small round loaves per day. Each large loaf occupies 0.01m³ of shelf space, each small loaf occupies 0.008m³ of space and there is 4m³ of shelf space available. There are 8 hours available each night for baking, and he can produce large loaves at the rate of 40 per hour and small loaves at a rate of 80 per hour. The profit on each large loaf is sh. 5.00 and sh.3.00 profit on the small loaf. Determine the number of large and small round loaves the baker should produce to maximize total profit. (20 marks)
- b) A marketing manager has 5 salesmen and there are 5 sales districts. Considering the capabilities of districts, the estimates made by the marketing manager for the states per month (in Ksh. 0000) for each sales man in each district would be as follows.

	A	B	C	D	E
1	35	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

Find the assignment of salesmen to the district that will result in maximum sales. (10 marks)

QUESTION 3

- a) Minicomputer Company purchases a component for which it has a steady usage of 1,000 units per year. The ordering cost is Ksh. 5000 per order. The estimated cost of money invested in inventory is 25% per year. The unit cost of the component is Ksh.4000. Calculate the optional ordering policy and total cost of the inventory system including purchase cost of the component. (10 marks)
- b) (i) Explain the components of a queuing system. (4 marks)
- (ii) A TV repairman finds that the time on his job has an exponential distribution with a mean of 30 minutes. If the repairman sets on first-come-first served basis and if the arrival of sets is with an average rate of 10 per eight hour per day, what is the repairman's expected idle each day? (6 marks)

QUESTION 4

- a) The following table lists the jobs of a project with their time of a project with their time estimates.

Estimated Time in Days

Job i - j	Optimistic Time T_o	Most – likely Time T_m	Pessimistic Time T_p .
1-2	3	6	15
1-6	2	5	14
2-3	6	12	30
2-4	2	5	8
3-5	5	11	17
4-5	3	6	15
6-7	3	9	27
5-8	1	4	7
7-8	4	19	28

- i) Draw the project network. (6 marks)
- ii) Calculate length and variance of the critical path. (8 marks)
- iii) What is the approximate probability that the jobs will be completed by the due date of 42 days? (6 marks)