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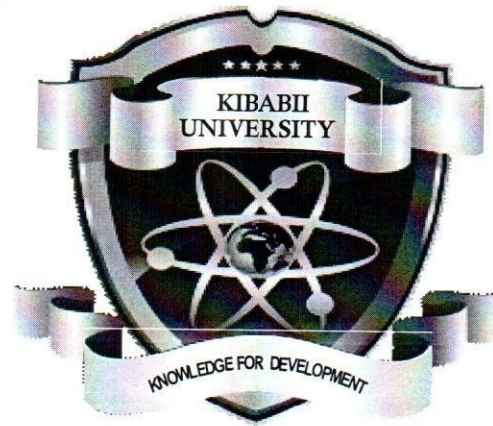

UNIVERSITY EXAMINATIONS

SPECIAL/SUPPLIMENTARY EXAMINATION
2020/2021 ACADEMIC YEAR
SECOND YEAR SECOND SEMESTER

FOR THE DEGREE OF BACHELOR OF COMMERCE/FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT

COURSE CODE: BCO 222/BBM 222

COURSE TITLE: MANAGEMENT DECISION MODELS

DATE: 20/01/2022   **TIME: 8.00 – 10.00AM**

INSTRUCTION TO CANDIDATES

1) The paper contains **FOUR** questions
2) Attempt **THREE** questions
3) Question **ONE** is <u>Compulsory</u>
4) Show your work clearly.

TIME: 2 Hours

KIBU observes **ZERO** tolerance to examination cheating

QUESTION ONE

a) Discuss the features or characteristics of Management Decision Models. (8marks)

b) Madhu Karatasi Ltd produces both interior and exterior paint from two raw materials M1 and M2. The table below provides the data.

Raw Materials	Tons of raw materials per ton of;		Maximum daily availability (tons)
	Exterior paint	Interior paint	
M1	6	4	24
M2	1	2	6
Profit per tons (Shs '000s)	5	4	

The daily demand of interior paint cannot exceed 2 tons. Additionally the daily production of interior paint cannot exceed that of exterior paint by more than 1 ton. Formulate this problem as a Linear Programming mathematical model. (10 marks)

c) In Queuing theory customers exhibit different kinds of behaviors. Discuss the behavioural factors of customers entering Queues. (8 marks)

d) Show the difference between Identity dummy activities and Logic dummy activities as applied in Network analysis. (4 marks)

QUESTION TWO

2. A company produces inexpensive tables and chairs. The production process for each is similar in that both require a certain number of hours of capentry work and a certain number of labour hours of in the painting department. Each table takes 4 hours of carpentry and 2 hrs in the painting shop. Each chair requires 3 hours of carpentry and 1 hour in painting. During the current production period 240 hours of carpentry time and 100 hours of painting time are available. Each table sold yields a profit of shs. 7 and each chair produced is sold for aprofit of shs. 5.

Required

a). Define the term Linear programming   (3 marks)

b). Formulate the above as a linear programming problem   (10 marks)

c). Using the graphical method the optimum number of tables and chairs that should be produced to maximize profit (10 marks)

QUESTION THREE

1. Plans are being made for a plant enlargement. Repair facilities for machine breakdowns are barely adequate in the existing plant and will certainly not provide acceptable service when more machines are added. Records of recent repair activities show an average of four

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QUESTION THREE

1. Plans are being made for a plant enlargement. Repair facilities for machine breakdowns are barely adequate in the existing plant and will certainly not provide acceptable service when more machines are added. Records of recent repair activities show an average of four

breakdowns per 8-hour shift. The pattern of breakdowns closely follows a poisson distribution. When the new additions to the plant are completed an average of six breakdowns per shift following the present distribution pattern is expected. An exponential distributed service rate of six repairs per shift is the capacity of the present repair facility. Two alternatives with equivalent annual cost are available. New equipment and larger crew for the existing station would increase the average service rate to 11 repairs per shift or a second servicing station could be built in the new addition. In the latter alternative, the capacity of the two service stations would be five servicing per shift in each. Repairs times would still be exponentially distributed.

Required

Which of the two alternatives would be more efficient in terms of customer waiting time?
(23 marks)

QUESTION FOUR

Two companies Lamu Bread Ltd (LB) and Bungoma Bread Ltd (BB) were recently launched into the Kenyan Market to produce and sell maize/wheat bread (MW bread). No other companies produces and sells MW bread after operating for a while, it was deemed necessary to establish the market shares of the two companies in MW bread. For this purpose a sample of 6400 consumers consisting of equal numbers for each company was selected at the beginning of April 2017. Their loyalty shifting pattern was observed to the end of the month. For this kind of market it is expected that 75% consumers of LB will keep their loyalty to the company's bread while the rest will shift to the competitors. It is further expected that 50% consumers of BB will shift their loyalty to LB and the rest will remain loyal to BB at the end of the month.

a) What is the initial state in this problem (3 marks)
b) Construct the transition matrix for MW market. (5 marks)
c) Based on this information, how many of the sampled consumers of MW bread will be consuming each of the company's bread by the end of
    i.   April 2017   (3 marks)
    ii.   May 2017 (3 marks)
    iii. End of a month-long-to-come   (4 marks)

d) Discuss the Assumptions of Markov Chains (5 marks)