KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR
SECOND YEAR SECOND SEMESTER

MAIN EXAMINATION

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: 19/05/2022 **TIME: 9.00AM – 11.00AM**

INSTRUCTION TO CANDIDATES

1) The paper contains **FIVE** questions
2) Attempt **THREE** questions
3) Question **ONE** is Compulsory
4) Show your work clearly.

TIME: 2 Hours

KIBU observes **ZERO** tolerance to examination cheating

QUESTION ONE

Out of the following multiple choice questions, choose the correct one

1) Operations Research (Management Decision Models) is the outcome of.
   A. National Emergency
   B. Political problems
   C. Combined efforts of Talents of all fields
   D. Economics and Engineering
2) The name of the subject operations research is due to the fact that.
   A. Problems can be solved by war approach
   B. The Researchers do the Operations
   C. The war problems and activities are generally known as Operations, and inventing a new way of solving such problems led to the term.
   D. Mathematical operations are used in solving the problems
3) The objective of Operations Research (Management Decision Models) is
   A. To find new methods of solving problems
   B. To derive formulas
   C. Optimal utilization of existing resources
   D. To utilize the services of the scientists.
4) The first step in solving Operations Research (Management Decision Models) problems is
   A. Model building
   B. Obtain alternative solutions
   C. Obtain basic feasible solutions
   D. Formulation of the problem
5) The model which gives physical and visual representation is
   A. Analogue Model
   B. Static Model
   C. Iconic Model
   D. Symbolic Model

6) One of the properties of Linear Programming model is

A. It will not have constraints

B. It should be easy to solve

C. It must be able to adopt to solve any type of problems

D. The relationship between problem variables and constraints must be clear

7) In Graphical method of solving Linear Programing problems, to convert inequalities into equations, we

A. Use slack variables

B. Use surplus variables

C. Use slack/ artificial variables

D. Simply assume them to be equations

8) In Simplex method, the Pivot row indicates

A. Incoming variable

B. Outgoing variable

C. Slack variable

D. Surplus variable

9) To transfer the Pivot row in the simplex Tableau, we have to

A. subtract the element of the pivot row from Pivot number

B. Add the element of the pivot row to Pivot number

C. Divide the elements of the pivot row by the pivot number

D. None of the above.

10) When we solve maximization problems by simplex method the elements of the net evaluation row of the optimal solution must be (when we use opportunity cost concept)

A. Either Zeros or positive numbers

B. Either Zeros or negative numbers,

C. All are negative numbers

D. All are Zeros

11) In Transportation problem, when the demand or Requirements is equal to the supply or capacity, we say that this problem is

A. Balanced problem

B. Regular transport problem

C. Resource allocation transportation problem

D. Simple transportation problem

12) When the total allocation in the transportation model of mxn is not equal to m + n -1, the situation is known as

A. Unbalanced situation

B. Tie situation

C. Degenerate situation

D. None of the above

13) A problem where the produce of a factory is stored in warehouses and then transported to various demand point as and when demand arises is known as

A. Transportation problem

B. Assignment problem

C. Warehouse problem

D. Storage and transportation problem

14) Assignment problem is solved by

A. Simplex method

B. Graphical method

C. Vector method

D. Hungarian method

15) To convert the assignment problem into a maximization problem

A. Deduct smallest element in the matrix from all other elements

B. All elements in the matrix are reduced from the highest element in the matrix

C. Deduct smallest element in any row from all the other elements in that row.

D. Deduct all elements in any row from the highest element in that row.

16) One of the important basic objectives of inventory Management is

A. To calculate EOQ for all materials in the Organization

B. To go in person to the market and purchase materials

C. To employ available capital efficiently to yield maximum results

D. Once materials are issued to departments, personally check how they are used

17) The stock of materials kept in stores in anticipation of future demand is known as

A. Storage of materials

B. Stock of materials

C. Inventory

D. Raw materials

18) Loses of inventory due to deterioration, theft and pilferage come under

A. Inventory carrying costs

B. Losses due to theft

C. No cost at all

D. General losses

19) A decision making problem is characterized by the following

A. Decision variables

B. State of nature

C. Payoff

D. All of the above

E. None of the above

20) In the decision making environment, under which situation that a decision maker cannot determine or estimate probabilities of occurrence for the states of nature

A. Certainty

B. Game theory

C. Uncertainty

D. Risk

21) While using the Hurwicz model , a decision maker is very optimistic if he uses an α (alpha) of ZERO

A. True

B. False

22) In the markov model, while the properties of the ignition state remain constant period by period, those of the matrix of transition keep changing

A. True

B. False

23) At a day-long-to- come, they is no further gain within the rival companies

A. True

B. False

24) Service time occurs according to Poisson distribution probability while arrivals according to exponential probability distribution

A. True

B. False

(30 marks)

QUESTION TWO

KIBU university Bookstore wishes to carry a particular book on Management Decision Models in the stock. Demand is probabilistic and the replacement of stock takes 2 days. The probabilities of demand are given below.

Daily Demand	0	1	2	3	4
Probability	0.05	0.10	0.30	0.45	0.10

Each time an order is placed the Bookstore incurs an ordering cost of shs. 10 per order. The store also incurs a carryin cost of 0.05 per book per day. The inventory holding cost is calculated on the basis of the stock at the end of each day.

The Bookstore Manager wishes to compare two options for his inventory decisions

Option 1: Order 5 books when the inventory t the beginning of the day plus orders outstanding is less then 8 books

Option 2: Order 8 books when the inventory t the beginning of the day plus orders outstanding is less then 8 books

At the beginning of the day (initially), the Bookstore has a stock of 8 books plus 6 books ordered two days ago expected to arrive the next day

Required.

a) Using the following random numbers simulate for each option, 10 cycles.

Random Numbers: 89, 34, 78, 63, 61, 81, 39, 16, 13, 73.

b) Recommend which option the Manager should Use

(20 marks)

QUESTION FOUR

Hema Company Ltd is in the business of selling property for vacation and/or retreat cottages. The primary market for these lake side lots include middle and upper income families within approximately one hundred miles. Hema Company Ltd employed an advertising firm *Kamusinga promotions Ltd* to design the design the promotional campaign for the project

After considering the possible advertising media and market to be covered, Kamusinga Promotions Ltd has made the preliminary recommendations to restrict the months advertising to five sources only. At the end of this month of the month Kamusinga Promotions Ltd will then reevaluate its strategy based upon the month's results.

Kamusinga Promotions Ltd has collected data on the number of potential purchase families reached, the cost per advertisement, the maximum number of times each media is available and the expected exposure for each of the five media.

The expected exposure is measured in terms of an exposure unit, management judgment measure in terms of the relative value of one advertisement in each of the media.

These measures according to Kamusinga Promotions Ltd's experience take into account such factors as audience profile (eg age, income, and education of the audience reached.), image presented, and quality of the advertisement.

The information collected to date is represented in the following table.

Advert. Media	Number of purchase families	Cost per Advert (in Kshs)	Maximum times available per month	Expected Exposure Units.
1. Day time TV (for 1 min)	1000	1500	15	65
2. Evening TV (for 30 secs)	2000	3000	10	90
3. Daily Newspaper (full page)	1500	400	25	40
4. Sunday newspaper (half page colour)	2500	1000	4	60
5. Radio (30 secs)	300	100	30	20

QUESTION THREE

Two bread baking companies Long Bread Ltd (LB) and Broad 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 2022. 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). 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 2022 (2 marks)

ii). May 2022 (2 marks)

iii). End of a month-long-to-come (3 marks)

b). Suppose when the MW bread market stabilizes it is projected that the total number of consumers of the bread will be 2.5 Million and that each consumer is expected to spend kshs. 500 on average per month. What are the projected revenues for the 2 companies in the MW bread market? (3 marks)

c). Suppose the MW bread market had three competitors namely LB, BB and SB (soft bread). To establish the market share in the MW bread market, a study was performed and the following data compiled. The study commenced at the beginning of April 2022

To / Fro	LB	BB	SB	TOTAL SAMPLED
LB	3000	400	600	4000
BB	1000	800	1400	3200
SB	1200	600	1000	2800

i. Based on this data, determine the transition matrix for the MW bread market. (7marks)

ii. Briefly explain what you understand by a transition Matrix. (3 marks)

The advertising budget is kshs 30,000. At least ten television campaigns must be used and at least 50000 potential purchasers must be reached during the month. In addition to that, no more than kshs18000 may be spent television advertisement.

Required.

Formulate this as a linear programming mathematical model (20 marks)

QUESTION FIVE

Rural Electrification Authority has started a project for the improvement of the Electricity Supply in Turkana County and have identified the following activities.

Name	Activity Description	Immediate Predecessor	Time Duration (weeks)
A.	SURVEY	-	12
B.	ESTIMATE AND SANCTION	A	4
C.	TREE CUTTING SCHEDULE	A	20
D.	STUBS AND TOWER PARTS	B	20
E.	AWARD CONTRACT FOR STUB	B	8
F.	AWARD CONTRACT FOR TOWER	B	8
G.	STUB SETTING FOR TOWERS	D,E	8
H.	TREE CUTTING	C	8
I.	TOWER ERECTION & STRINGING	F,G,H	12
J.	ENERGIZING	I	4

Required

a) Draw a suitable AOA network Diagram (10 marks)

Spell out your assumptions in designing this network (5 marks)

b) Find the estimated time to complete the transmission line project (5 marks)