



MAASAI MARA UNIVERSITY
REGULAR UNIVERSITY EXAMINATIONS 2020-2021
ACADEMIC YEAR
FOURTH YEAR FIRST SEMESTER

SCHOOL OF BUSINESS AND ECONOMICS
BACHELOR OF SCIENCE IN FINANCIAL
ECONOMICS

COURSE CODE: BCM 3107

COURSE TITLE: OPERATIONS RESEARCH

DATE:

TIME:

INSTRUCTIONS TO CANDIDATES

Question **ONE** is compulsory

Answer any other **THREE** questions

QUESTION ONE

a) Explain what is meant by Operations Research

(3Marks)

- b) Give six important techniques of operations research. **(3Marks)**
- c) Explain what you understand by the term Linear Programming. **(3Marks)**
- d) Explain what Linear Programming Formulation means **(4Marks)**
- e) Clearly explain the four different types of inventory costs **(8 Marks)**
- f) Explain giving examples degeneracy as applied to Transportation problem **(4 Marks)**

QUESTION TWO

Two products X and Y both require processing time on machines I and II. Machine I has 200 hours available and Machine II has 400 hours available.

Product X requires one hour on Machine I and four hours on Machine II.

Product Y requires one hour on Machine I and one hour on Machine II.

Each unit of product X yields Ksh. 10 profit and each unit of Y yields ksh.55 profit.

Required

- a. Develop an LP mathematical model **(3 Marks)**
- b. Solve the problem graphically **(5 Marks)**
- c. Solve the problem using the Simplex Method. **(7Marks)**

QUESTION THREE

- a) Develop a hypothetical tabular formulation of a Transportation Model **(4 Marks)**
- b) John and Johnson Enterprises has four factories supplying fourty warehouses.

The Management wants to determine the minimum shipping cost schedule for its monthly output of chess sets.

Factory supply warehouse demands and shipping costs per case of chess sets are as shown below.

Shipping Costs Per Case (in Dollars)								
Factory	Supply	Warehouse	Demand	From	To E	To F	To G	To H.
A	15	E	10	A	\$25	\$35	\$36	\$60
B	6	F	12	B	55	30	45	38
C	14	G	15	C	40	50	26	65
D	11	H	9	D	60	40	66	27

Required

Develop a Transportation Model, in a tabular form **(4 Marks).**

Using the Vogels Approximation Method (VAM), determine the minimum cost schedule. **(7 Marks)**

QUESTION FOUR

- a. Explain what is meant by Inventory as applied to operations research **(3 Marks)**
- b. Inventory is a necessary evil. Using well labeled diagrams to support your answer, discuss this statement. **(6Marks)**
- c. Using the necessary relevant diagrams to support your answer, differentiate between Fixed Order Quantity Model and Time Model as applied to inventory. **(6 Marks)**

QUESTION FIVE

A project has been defined to contain the following list of activities, along with their required times for completion:

Activity Time (days) Immediate Predecessors

A	1	–
B	4	A
C	3	A
D	7	A
E	6	B
F	2	C, D
G	7	E, F
H	9	D
I	4	G, H

- a. Draw the critical path diagram.
- b. Show the early start and early finish times.
- c. Show the critical path.
- d. What would happen if activity F was revised to take four days instead of two?