NATIONAL OPEN UNIVERSITY OF NIGERIA
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
2023_1 POP EXAMINATION

COURSE TITLE: OPERATIONS RESEARCH
COURSE CODE: ECO 314
UNITS: 2
TIME ALLOWED: 2 HOURS

INSTRUCTION: ANSWER ANY THREE (3) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS

QUESTIONS

QUESTION ONE

1a. Consider a sweet manufacturing company that produces only two types of sweet – A and B. Both the sweets require honey and peppermint only. To manufacture each unit of A and B, the following quantities are required:

- Each unit of A requires 1 unit of honey and 3 units of peppermint
- Each unit of B requires 1 unit of honey and 2 units of peppermint

The company kitchen has a total of 5 units of honey and 12 units of peppermint. On each sale, the company makes a profit of

- ₦6 per unit A sold
- ₦5 per unit B sold.

Formulate this problem into a mathematical model (Maximize profit subject to constraints only. You are NOT required to graphically calculate the profit maximizing values of A and B). (14.5 Marks).

1b. Define the following terminologies used in Linear Programming using the example in question 1a. (9 Marks):

i. Decision Variables
ii. Objective Function
iii. Constraints

QUESTION TWO

3a. (i) Define Decision Tree (3 Marks)
    (ii) Give reasons why Decision Tree Diagramme is needed? (4.5 Marks)
3b. When all activities and events in a project are connected logically and sequentially, they form a network, which is the basic document in network-based management. List five (5) basic steps for writing a network (16 Marks)

QUESTION THREE

4a. Discuss the four (4) main advantages of linear programming methods (13.5 Marks).

4b. Define Project Management? (10 Marks).

QUESTION FOUR

5. There are 3 jobs *A*, *B*, and *C* and three machines *X*, *Y*, and *Z*. All the jobs can be processed on all machines. The time required for processing job on a machine is given below in the form of matrix. Make allocation to minimise the total processing machines (time in hours). (23.5 Marks)

Jobs	X	Y	Z
A	10	14	19
B	20	13	17
C	13	15	12