



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI, ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF COMPUTER SCIENCE
OCTOBER, 2019 EXAMINATIONS

COURSE CODE: CIT425

COURSE TITLE: OPERATIONS RESEARCH

COURSE CREDIT: 3 UNITS

TIME ALLOWED: 2½ HOURS

INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER FOUR (4) QUESTIONS

Question 1

- 1a. Outline and briefly explain all the assumptions of linear programming. *(10 marks)*
- 1b. List the basic facts about Operations Research as a concept *(2 marks)*
- 1c. Illustrate in details, within the context of operations research, the Dynamic Programming Approach. *(7 marks)*
- 1d. Analyse the steps involved in problem formulation in operations research. *(3 marks)*

- 2a. Enumerate the Limitations of Operations Research *(3 marks)*
- 2b. Compose the ways operation research uses the computer *(9 marks)*

3. Generally, 'Models' are frequently used in operations research. Identify and describe any four (4) types of Models in Operations Research. *(12 marks)*

4. The village butcher shop traditionally makes its meat from a combination of lean ground beef and ground pork. The ground beef contains 80 percent meat and 20 percent fat, and cost the shop 80 pound; the ground pork contains 68 percent meat and 32 percent fat, and cost 60 pound. How much of each kind of meat should the shop use in each pound for meat loaf if it wants to minimize its cost and to keep the fat content of the meat loaf to no more than 25 percent. *(12 marks)*

5. A farmer has 100 acres on which to plant two crops; Corn or wheat. To produce these crops, there are certain expenses as shown in the table:

Item	Cost Per Acre (₦)
Corn	
Seed	12
Fertilizer	58
Planting/care/harvesting	50
Total	120
Wheat	
Seed	40
Fertilizer	80
Planting/care/harvesting	90
Total	210

After the harvest, the farmer must store the crops awaiting proper market conditions. Each acre yields an average of 110 bushels of corn or 30 bushels of wheat. The limitations of resource are as follows:

Available capital: ₦15,000

Available storage facilities : 4,000 bushels

If net profit (the profit after all expenses have been subtracted) per bushel of corn is N1.30 and for wheat is N2.00, how should the farmer plant the 100 acres to maximize the profit?(12 marks)

6a. Write down the first three (3) steps involved in solving Operations research problem using simplex method. (6 marks)

6b.

Project	Investment during year			PV of expected return
	1	2	3	
P-1	1000,000	600.00	500.00	800.00
P-2	500,000	200.00	400.00	700.00
P-3	300,000	250.00	350.00	400.00
P-4	400,000	300.00	260.00	300.00
Fund for investment	18,00,000	10, 00,000	800,000	

An investment consultant has four projects with different investment and present value of expected returns Funds. Available for investment during the three proposal are also available. The detailed information regarding the project is as follows. Formulate an integer programming model for the consultant to make a decision as to which project should be accepted in order to maximize present value of expected return. (6 marks)