



**NATIONAL OPEN UNIVERSITY OF NIGERIA
DEPARTMENT OF ECONOMICS
FACULTY OF SOCIAL SCIENCES
SEPTEMBER, 2020_1**

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

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO
QUESTIONS. QUESTION ONE CARRIES 30 MARKS WHILE
OTHER QUESTIONS CARRY 20 MARKS.**

QUESTION ONE

1. Explain the term; Linear Programming? **2 Marks**
1b. Briefly explain the 'Merits' and 'Demerits' of using Linear Programming methods. **6 Marks**

- 1c. The table below shows the payoffs of ABEL Nig. Plc, an investor who has the choice of either investing in the production of pizza or ice cream or desert cake. Whichever of the three products he decides to produce; he will encounter three types of market demand. It may turn out that the market demand for any of the product is high, moderate or low.

Alternative Products	Market Demand		
	High	Moderate	Low
Pizza	600	350	-175
Ice Cream	800	400	-150
Desert Cake	500	300	-130

As a student taking operations research as a course, you are expected to analyze ABEL Nig. Plc decision problem using the following criteria:

- i. Maximax Criterion or Criterion of Optimism
ii. Maximin Criterion or Criterion of Pessimism (Wald Criterion)
iii. Minimax Regret Criterion (Savage Criterion)
vi. Laplace Criterion or Equally likely criterion or criterion of Rationality (Bayes' Criterion)
v. Hurwicz Criterion or Criterion of Realism **22 Marks**

QUESTION TWO

2. List the essential information that should be available before using transportation model in an operation. **7½ Marks**
2b. Discuss any five types of Assignment Problems. **12½ Marks**

QUESTION THREE

3. Explain concisely the essential areas and methods required to effectively manage a project. **14 Marks**
- 3b. The process of analysing decision can be categorized into three phases. Discuss these phases of decision analysis cycle. **6 Marks**

QUESTION FOUR

4. Dangote Group of Com. are producing three products (Salt, Flour and Rice). These products are processed on three different processors. The time required for producing one unit of each of these goods and the daily capacity of the three processors are stated in the table below.

Processors	Time Per Unit (Hours)			Processor Capacity (Hours/day)
	Salt	Flour	Rice	
Processor1	4	5	6	550
Processor2	3	2	3	590
Processor3	0	3	4	520

Note that the profit per unit for salt, flour and rice is ~~₦8~~, ~~₦6~~ and ~~₦12~~ respectively. It is assumed that all the amounts produced are consumed in the market. Based on the above information, formulate the mathematical (LP) model that will maximise the daily profit.

- 4b. Outline the major characteristics of Operation Research. **15 Marks**
- 5 Marks**

QUESTION FIVE

5. Discuss the classification of models according to the following; **12 Marks**
- i. By degree of abstraction and ii. By function.
- 5b. Games can be described in terms of the number of players and the type of sum obtained for each set of strategies employed. In the light of the above, describe the various forms of games. **8 Marks**