LAGOS CITY POLYTECHNIC, IKEJA

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2015/2016 SEMESTER EXAMINATION

COURSE TITLE: OPERATIONS RESEARCH I NO OF QUESTION : 5
COURSE CODE: STA 314 TIME ALLOWED: 2 HRS
FOR WHOM: HND YR I CS PT INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS

1. (a) (i) Define and state the characteristics of linear programming
(ii) State the steps involved in formulating linear programming problems.

(b) A bottling company produces Fanta Orange and Fanta Lemon. Each bottle of Fanta Orange requires one (1) hour of machining, 5 hours of Labour and 3 kilogrammes of material while each bottle of Fanta Lemon requires 2 hours of machining, 4 hours of Labour and 2 kilogrammes of material.

The bottling company has 700 hours of maching, 1700 hours of labour and 800 kilogrammes of materials available to produce the two types of drink.

Formulate and sole the linear programming problem if the profit on every bottle of Fanta Orange and Fanta Lemon are N4.00 and N5.00 respectively.

2. (a) Describe the terms degeneracy and unbalanced transportation problem and their consequences and solutions.

(b) A company has four manufacturing plants located at Abuja, Kano, Kebbi and Port Harcout. Each plant is to produce items for the immediate environment and sent the surplus to one of the companys depot located at Lagos, Enugu and Kaduna.

The needs of the environment at which the plants are located at 6,000 for Abuja, 4,500 for Kano, 8,000 for Kebbi and 7,500 for Port-Harcourt while the total production figures for Abuja, Kano, Kebbi and Port-Harcourt are 10,000; 9,500; 13,500 and 11,000 respectively.

The transport cost (N per unit) are given below:

	Lagos	**Ibadan**	**Enugu**	**Kaduna**	**Available**
Abuja	15	30	25	45	X
Kano	25	35	40	20	Y
Kebbi	35	20	45	50	Z
P/Harcout	10	35	15	45	W
Requirement	6000	5000	3000	4000	18000

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(i) Determine the value of X, Y, Z, W
(ii) Use North West corner method to allocate the items from plant to the depots.
(iii) Interprete your results in (d) ii

3. (a) Define the state the characteristics of Markov chain.
(b) Suppose three Communication CompaniesMTN, AIRTEL and GLO are covering Coconut Estate comprising 500,000 subscribers. Records have shown that:
MTN retained 80% of its subscribers and lost 10% each to AIRTEL and GLO. AIRTEL retained 50% of its subscribers and lost 30% to MTN.

GLO retained 50% of its subscribers and lost 10% to AIRTEL.

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