NATIONAL OPEN UNIVERSITY OF NIGERIA
91, Cadastral Zone, NnamdiAzikiwe Express Way, Jabi-Abuja
FACULTY OF MANAGEMENT SCIENCES
JANUARY 2018 EXAMINATION

Course Code: Bus 800
Course Title: Quantitative Analysis

Credit Unit: 2

Instructions: 1. Attempt Question 1 and any other two (2) questions
2. Question 1 is compulsory and carries 30marks while the other 2 questions carry 20marks each
3. Present all your points in coherent and orderly manner
Time Allowed: 2 Hours

1a. With example, define the following sets
i. Finite and Infinite sets
ii. Equality of sets
iii. Null sets
iv. Comparability of a sets **6 marks**

1b. Let A = (V, W, X , Y) and B (L, V, N, W), Then
i. A η B ii. A U B **4 marks**

1c Let A (5, 6, 7, 8) B (5, 2, 6, 1) C (2, 3, 7, 8), then,
i. A U B ii. A U C iii. B U C iv. A η B
v. (A U B) U C vi. A U (B U C) **6 marks**

1d Let A = (3, 5), B = (6, 8)
i. A C B ii. A − B **4 marks**

1e Explain with examples, Bounded and unbounded sets. **2marks**

1f. Let f: A $\longrightarrow$ B and g: B $\longrightarrow$ C be two functions, then denote functions f and g. **4 marks**

1g To each real number, let f assign its square i.e let f (X) = X^2 .and g (X) = x + 3, then denote f and g. **4 marks**

2a. A wholesaler stock heavy (2B), medium (HB), fine (2H) and extra fine (3H) pencils, which come in packs of 10 currently in stock are 4 packs of 3H, 14 packs of 2H, 35 packs of HB and 8 packs of 2B. if a pack of pencil is chosen at random for inspection, what is the probability that they are:

(i) medium (ii) heavy (iii) Not very fine (iv) neither heavy nor medium

6 marks

2b. A number of family of a particular type were measured by the number of children they have the following frequency distribution

Number of Children	Number of families
0	5
1	4
2	5
3	12
4	11
5	15

Use this information to calculate the (relative frequency) probability that another family of this type chosen at random will have

i. 2 children ii. 3 or more children iii. Less than 2 children

6 marks

2c A display of 15 T-shirts in a sport shop containing three different sizes: small, medium and large of the 15 T-shirts

3 are small
6 are medium
6 are large

If two T-shirts are randomly selected from both a small T-shirt and a large T=shirt, the first not being replaced before being selected? **4 marks**

2d Explain the concept of certainty and uncertainty in the decision making process?

4 marks

3a. What is decision tree? **2 marks**

3b. Explain the merits and demerits of decision tree as a tool of decision making process.

6 marks

3c. Explain two criteria available for decision makers under condition of risk.

4 marks

3d. A client has contracted NOUNCIL, a real estate firm to help him sell three properties A,B,C that he owns in Banana Island. The client has agreed to pay NOUNCIL 5% commission on each sale. The agent has specified the following conditions: NOUNCIL must sell property A

first, and this he must do within 60days. If and when A is sold, NOUNCIL receives 5% commission on the sale, NOUNCIL can then decide to back out on further sale or go ahead and try to sell the remaining two property B and C within 60 days. If they do not succeed in selling the property within 60days, the contract is terminated at this stage. The following table summarises the prices, selling Costs (incurred by NOUNCIL whenever a sale is made) and the probabilities of making sales, the pay-off matrix table is shown thus:

Property	Prices of property	Selling cost	Probability
A	12000	400	0.7
B	25000	225	0.6
C	50000	450	0.5

(i) Draw an appropriate decision tree representing the problem for NOUNCIL

.

(ii) What is NOUNCIL's best strategy under the EMV approach?

8 marks

4a. Outline the steps in formulating linear programming model **4 marks**

4b What are the basic assumptions of linear programming models **4marks**

4c Explain the circumstances of applying linear programming models. **4 marks**

4d. An advertising company wishes to plan its advertising strategy in three different media television, radio and magazines. The purpose of advertising is to reach as large a number of potential customers as possible. Following data have been obtained from market survey:

	Television	Radio	Magazine 1	Magazine 11
Cost of an advertising	#40000	#30000	#25000	#20000
Number of	#190000	#590000	#160000	#100000

potential customer reached per unit				
Number of female customer reached per unit	#160000	#400000	#80000	#60000

The company wants to spend not more than #450,000 on advertising. Following are the further requirements that must be met: at least I million exposures take place among female customers, advertising on magazines be limited to #150,000,
at least 3 advertising units be bought on magazine I and 2 units on magazine II, the number of advertising units on television and radio should each be between 5 and 10.
Formulation of Linear Programming Model **8 marks**

5a Explain the scientific methods of operational research. **2 marks**

5b. Simulation has been regarded as a versatile and commonly used technique for solving decision problems. Explain its application to science and technology. **3marks**

5c. In spite of the benefits of simulation to the science and technology, what are the limitations in its application. **5 marks**

5d. Write notes on the following

i. Open system ii. Closed system iii. Probabilistic system iv Deterministic v. Social system **10 marks**