NATIONAL OPEN UNIVERSITY OF NIGERIA
University Village, Plot 91, Cadastral Zone, NnamdiAzikiwe Express Way, Jabi, Abuja

FACULTY OF SCIENCES

JULY 2017 EXAMINATION

CIT412: Modeling and Simulation
TIME ALLOWED: 3Hours
INSTRUCTION(S): Attempt any Four (4) questions

Question 1

a) In modern research, code mixed is widely encouraged due to the limitations of using either quantitative or qualitative method; discuss any 5 advantages and disadvantages of mixed method **- 6 marks**

b) List the categorizations of simulation languages? Give two examples for each category **- 6 marks**

c) Distinguish between the following sampling methods: Stratified, Cluster and Multistage sampling **– 5 marks**

Question 2

a. Briefly discuss the application of stochastic process in natural sciences, finance, artificial intelligence, biology and social sciences **- 8.5 marks**

b. Discuss the application of Monte Carlo methods in areas such as physical sciences, telecommunication, engineering, finance and visual designs – **9 marks**

Question 3

a) i. Define a normal distribution - **2 marks**

ii. Discuss the concept of a normal distribution as a model and the steps adopted by researchers in assessing probabilities associated with real-world phenomena **- 7.5 marks**

b) Briefly describe simulation in six application areas of your choice - **8marks**

Question 4

a) State Monte Carlo method algorithm **- 5 marks**

b) A salesman averages one call each day and his results show that 50% of the call leads to a sale. Simulate two sequences of results for the salesman covering a period of 10 days. Use the following sequence of random numbers: 8, 4, 3, 7, 9, 0, 6, 1, 5, 6 and 3, 6, 6, 7, 1, 0, 0, 8, 2, 3 **- 12.5 marks**

Question 5

a) What is a probability distribution **- 4 marks**

b) List the distributions related to:

i. Bernoulli trials ii. Normally distributed outcomes iii. Hypothesis testing

- 6 marks

c) There are two approaches in simulation model development. Compare these methods **- 7.5 marks**