NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
SCHOOL OF SCIENCE AND TECHNOLOGY
MAY/JUNE 2012 EXAMINATION

CIT 412 MODELLING AND SIMULATION
TIME ALLOWED: 3 HOURS

INSTRUCTION: ANSWER ANY FIVE QUESTIONS IN ALL

1a. Enumerate six (6) properties of a good Random number generator. *[6 marks]*

1b. Define the below graphs and show the data distribution of the below table in the bar graph and pie chart

• Bar graphs • Double bar graphs • Histograms and • Pie Charts use port. *[7 marks]*

Name	value
Olu	23
Ade	32
Ope	51
Tunde	67
James	12

1c. State four (4) types of Simulations. *[4 marks]*

1d. Highlight the Advantages of using Model. *[3 marks]*

2a. Briefly explain what is meant by a Model. *[5 marks]*

2b. Suppose we have a sample with the following 6 observations: 4, 5, 7, 2, 1, 2. Show your workings by calculating the Measures of Central Tendency, Range and Standard Deviation as Measures of Variation. *[10 marks]*

2c. Explain Queuing theory. *[5 marks]*

3a. What is a Random Number? *[3 marks]*

3b. State the Theorem of Multiplication of Probabilities. *[9 marks]*

3c. Using Mixed Congruential formula, suppose m = 8, a = 5, c = 7 and X_0 (seed) = 4, generate a random sequence of integer numbers in a tabular form. *[8 marks]*

4a. Discuss Poisson Process. *[6 marks]*

4b. Why simulation language? *[10 marks]*

4c. What is the chances of generating any digits between 0, 1, 2,3,4,5,6,7,8, 9 as the nth drawn number from the given numbers 0-9 irrespective of all the preceding digits in the recorded sequence of Pseudorandom Number Generation. *[4 marks]*

5a. Discuss Monte Carlo algorithm and highlight the methods used by the algorithm. *[7 marks]*

5b. Explain in detail the queuing disciplines and its four (4) methods/disciplines. *[10 marks]*

5c. Write a simple QBASIC program that will stimulate the tossing of two dice and display the value obtained after each toss, and the total value of the dice. *[3 marks]*

6a. Write note on the factors of evaluating a model.
[6 marks]

6b. Discuss how Congruential generator Algorithm generates random numbers. [4 marks]

6c. Define any five (5) common models.
[10 marks]

7a. Differentiate between Physical and Mathematical Models.
[10 marks]

7b. What is a Statistical Distribution? *[3 marks]*

7c. Enumerate seven (7) Application areas of Monte Carlo Met