



NATIONAL OPEN UNIVERSITY OF NIGERIA

14/16, Ahmadu Bello Way, Victoria Island

SCHOOL OF SCIENCE AND TECHNOLOGY

October, 2013 Examination

COURSE CODE: CIT 412

COURSE TITLE: MODELLING & SIMULATION

INSTRUCTION: *Answer any four questions out of six.*

Time: 2 HOURS

1. (a) Using Monte Carlo's Algorithm, outlining the steps involved in deriving an algorithm.
(b) Enumerate and discuss the areas of application of the Monte' Carlo Method.
2. (a) Explain the term Simulation and enumerate its objectives and its various types.
(b) Using suitable diagram, explain the various steps involved in the physical simulation process.
3. (a) Briefly explain the Congruential Methods. Using the Congruential method, generate at least eight sets of random numbers, where $m = 8$, $a = 5$, $c = 7$ and the Seed $X_0 = 4$.
(b) Enumerate and discuss explicitly the various methods of generating random numbers; indicating the formulas applicable under each methods.
4. (a) Using suitable diagram, explain the term Visual Modelling.
(b) Enumerate and explain five types of Models available, outlining at least five procedures involved in modelling.
5. (a) Briefly explain when a probability is:
 - i. Jointly
 - ii. Mutually Exclusive
 - iii. Conditional
(b) Outline and discuss the three perspective to a Data Model
6. (a) Explain how a computer generates a sequence of random numbers, outlining other ways of Generating pseudo-random numbers.
(b) Write a QBASIC program to simulate the tossing of a fair coin 10 times. The program displays a H when a Head appears and a T when a Tail appears.