# NATIONAL OPEN UNIVERSITY OF NIGERIA
# 14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
## SEPTEMBER/OCTOBER 2015 EXAMINATION

## SCHOOL OF SCIENCE AND TECHNOLOGY

**COURSE CODE:** **CIT412**

**COURSE TITLE:** **MODELLING AND SIMULATION**

**INSTRUCTION:** ***Answer any five questions.***
**Time: 2 HOURS**

1.
   a) Distinguish between **physical** and **mathematical** models.
   b) Briefly explain what simulation is listing its benefits.
2.
   a) Write down the steps involved in modelling.
   b) Briefly explain what a **random number** is and describe how it is generated and its role in computer simulation.
3.
   a) Briefly describe the **Monte Carlo algorithm**, stating the four steps involved.
   b) Describe how the Monte Carlo method is applied in computing the value of .
4.
   a) Using a sketch briefly describe what a **normal random distribution** is. b)
      i. Briefly explain what a **standard normal distribution** is.
      ii. Write down the formula for transforming a **normal random variable** X into a **standard z-Score** variable z.
5.
   a) Write brief notes on the following **areas of application** of computer simulation:
      i. Education
      ii. Urban Simulation
      iii. Training
   b) Briefly describe the following types of models:
      i. Conceptual
      ii. Visual
6.
   a) Briefly explain what **queuing theory** is.
   b) Write down **Little's Queuing formula** and describe the theorem it represents.