NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION

RTMENT OF SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION

SIMULATION AND MODELLING

PST 6375

MAIN EXAMINATION PAPER

DECEMBER 2024

This Examination Paper consists of 3 pages

Time Allowed:	**3 hours**
Total Marks:	**100**
Special Requirements:	**NONE**
Internal Examiner:	**Ms D Moyo**
External Examiner:	**Dr B Moyo**

INSTRUCTIONS

1. Answer any four (4) questions.

2. Each question carries 25 marks

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5.	25
TOTAL	100

Question 1

a) Define the following terms as used in simulation and modelling,
    i.   Variable   [3marks]
    ii.   Attribute   [3marks]
    iii. Simulation   [3marks]
    iv. Entity   [3marks]
    v.   Model   [3marks]

a) Discuss the benefits of simulation and modelling using appropriate examples. [10marks]

Question 2

Discuss how simulation and modelling can be used in the teaching and learning in high schools. [25marks]

Question 3

a) Discuss the steps in simulation study giving appropriate examples. [12marks]

b) Compare and contrast between continuous and discrete simulation models. [13marks]

Question 4

a) Using the linear congruential generation methods by Lehmer, generate random numbers for - where :
    i. $X_0 = 27$
    ii. $a = 13$
    iii. $c = 64$
    iv. $mod = 100$

Generate first 5 numbers. [15marks]

b) Discuss the characteristics of a good number generator.

[10marks]

Question 5

a) Discuss the idea of simulation as an appropriate tool and as not an appropriate tool.

[12marks]

b) Explain using examples the advantages and disadvantages of using simulation modelling. [13marks]