(Knowledge for Development)

KIBABII UNIVERSITY
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UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF
BACHELORS OF SCIENCE
(INFORMATION TECHNOLOGY)

COURSE CODE: BIT 415

COURSE TITLE: SIMULATION AND MODELING

DATE: 21/06 /2021   **TIME:** 2.00 P.M. - 4.00 P.M.

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (COMPULSORY) [30 MARKS]

a. Explain the following types of simulation models

   (i) Task Trainer Simulation   **[2 marks]**

   (ii) Manikin-based Simulation   **[2 marks]**

   (iv) Virtual Reality Simulation   **[2 marks]**

   (v) Tissue-based Simulation   **[2 marks]**

b. What is difference between simulation and modeling   **[2 marks]**

c. What is a building model?   **[2 marks]**

d. What are the Potential problems with deterministic generators   **[2 marks]**

e. Briefly explain the basic features of MATLAB.   **[4 marks]**

   i. Give two Properties of Random Numbers.   **[2 marks]**
   ii. Applications of modeling and simulation   **[4 marks]**
   iii. Define the black box approach   **[2 marks]**
   iv. Define linear regression   **[2 marks]**
   v. What does Linear in parameters mean in Linear Regression?   **[2 marks]**

QUESTION TWO [20 MARKS]

a. Different models present the system from different perspectives, Name the three perspectives

                                          [6 marks]

b. State and explain the **FOUR** main aspects of descriptive modeling.   **[8 marks]**

c. Give the functions of the following **System Models.**   **[6 marks]**

   (i) Context **models**

   (ii) Data flow **models**

   (iii) State machine **models**

QUESTION THREE [20 MARKS]

a. What is the function of Simulation Tools?   **[2 marks]**

b. Explain the following typical black-box test design techniques   **[10 marks]**

   (i) Decision table testing

   (ii) All-pairs testing

(iii) Equivalence partitioning

(iv) Cause Effect Graph

(v) Error guessing

c. Give **TWO** reasons for the steadily increasing interest in simulation applications

[2 marks]

d. Name and Explain **Three** different types of regression models. [6 marks]

QUESTION FOUR [20 MARKS]

a. What is the meaning of **Pseudo-Random Numbers** as used in simulation and modeling

[2 marks]

b. Name at least two functions of linear models. [2 marks]

c. State and explain SIX types of models [12 marks]

d. Give the Difference between continuous Simulation and discrete event Simulation

[4 marks]

QUESTION FIVE [20 MARKS]

a. The **MATLAB system** consists of five main parts name and explain them. [10 marks]

b. Define the following terms as used in simulation modelling. [4 marks]

    (i)   Parameter estimation

    (ii)   Maximum Likelihood Estimation

    (iii)   Parameter estimates

    (iv)   Least Mean Square Error

c. Discuss the Use of simulation methodology [6 marks]