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Subject Code:- AMTME0101

Roll. No:

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: I - THEORY EXAMINATION (2022 - 2023)

Subject: Simulation modelling and analysis

Time: 3 Hours

Max. Marks: 70

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A

15

1. Attempt all parts:-

- 1-a. Which characteristics of computer simulation focus on the value changes of influenced and observed variables? (CO1) 1
- (a) Interactive
(b) Model based
(c) Interface driven
(d) Scaffolded
- 1-b. Which of the following statistical methods are commonly used to analyze simulation results? (CO2) 1
- (a) Recursion
(b) Regression analysis, t-tests, Analysis of variance
(c) P-mean
(d) Q-test
- 1-c. Verification of a model is (CO3) 1

- (a) Comparing the result of two model
 - (b) Comparing the two result of a model
 - (c) Comparing the result of a model to its conceptual model
 - (d) All of the above
- 1-d. In which module, types of the element is selected in Abaqus (CO4) 1
- (a) Part
 - (b) Meshing
 - (c) Load
 - (d) Intraction
- 1-e. The 'clc' command is used for (CO5) 1
- (a) clear the command window
 - (b) erase everything in the mfile
 - (c) clean the desktop
 - (d) save the existing mfile

2. Attempt all parts:-

- 2.a. What are the difficulties faced in the simulation? (CO1) 2
- 2.b. What assumption are taken for a common queuing mathematical models? (CO2) 2
- 2.c. How to decide number of interval for uniformity test? (CO3) 2
- 2.d. Explain, if you accept a model which is not correct then which type of error do you commit? (CO4) 2
- 2.e. How a trigonometric function is defined in MATLAB? (CO5) 2

SECTION B

20

3. Answer any five of the following:-

- 3-a. Explain in brief, Bernoulli Trials and Bernoulli Distribution. (CO1) 4
- 3-b. A simulation of a major traffic intersection is to be conducted, with the objective of improving the current traffic flow. Providing three iterations, in increasing order of complexity. (CO1) 4
- 3-c. Which method is used to develop model for the ATM (bank) case study? (CO2) 4
- 3-d. Discuss the basic elements (or structure) of waiting line situations. (CO2) 4
- 3.e. What are the different types of model assumptions for validation? Explain them in detail. (CO3) 4
- 3.f. How can artificial Intelligence help a user in a computer simulation? Explain in 4

brief. (CO4)

- 3.g. How do structural stress analysis in MATLAB? Explain with suitable steps. (CO5) 4

SECTION C

35

4. Answer any one of the following:-

- 4-a. Sketch the basic flowchart for a discrete-event simulation model. Explain each steps. (CO1) 7
- 4-b. Explain 5 typical applications of simulation each in (a) manufacturing system (b) transportation systems? (CO1) 7

5. Answer any one of the following:-

- 5-a. Consider an M/M/1 queue in which customers arrive at a rate of 20 per hour, and the average service time is 150 seconds. What is the average number of customers in the system, and how long, on average, does each spend in the system and in line? Answer the question also if the arrival rate increases by 10%. (CO2) 7
- 5-b. Why Chi-square test is performed? In which cases need to perform chi-square test in simulation modelling and analysis? (CO2) 7

6. Answer any one of the following:-

- 6-a. Explain the algorithm of Inverse-Transform technique of random variate generation for exponential distribution. (CO3) 7
- 6-b. Explain the Acceptance and Rejection technique for Random Variate Generation. (CO3) 7

7. Answer any one of the following:-

- 7-a. Can a simulation model be verified but not validated and vice-versa? Investigate your answer with an example for each. (CO4) 7
- 7-b. Discuss 5 techniques for increasing a model's validity and credibility. (CO4) 7

8. Answer any one of the following:-

- 8-a. What are the different types of meshing elements available in any simulation software? How to decide the type of element for meshing in simulation software? (CO5) 7
- 8-b. What are the various modules available in MATLAB. Explain any four in brief. (CO5) 7