BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : IV**
BRANCH: PROD **SESSION : SP/2025**

SUBJECT: PE222 DISCRETE EVENT SYSTEM SIMULATION

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Differentiate between static and dynamic, discrete and continuous, stochastic and deterministic simulation models with suitable examples for each.	[5]	1	2
Q.1(b)	Give a discussion on various iterative processes existing in modelling and simulation with the help of a flowchart.	[5]	1	3
Q.2(a)	Differentiate between queue behavior and discipline. Decode the queue G/G/1/5/5	[4]	2	3
Q.2(b)	Given A, B, and C, which are uncorrelated random variables. A is uniformly distributed in [6, 13], variable B is discrete uniformly distributed with probability distribution given by p(b) = 0.2 with b = 0, I, 2, 3 and 4. Variable C is distributed in accordance with the following table:	[6]	2	3

Value of C	Probability
10	0.1
20	0.25
30	0.5
40	0.15

Use simulation (of five values) to estimate the mean of a variable D = (A+25B)/(2C)

Q.3(a)	How the calculations in a deterministic EOQ model are affected under stochastic conditions. Can discrete event simulation help in this regard. Explain.	[5]	3	3
Q.3(b)	Discuss about various simulation software and languages for discrete event system simulation.	[5]	3	2
Q.4(a)	How could random numbers that are uniform on the interval [0, 1] be transformed into random numbers that are uniform on the interval [-11, 17] ? Transform 0.682 as an example. Also find a random number in [0, 1] which will be transformed to '0' in [-11, 17].	[5]	4	4
Q.4(b)	The time to failure of a chip follows exponential with a mean of 5000 hours. (a) The chip has been in operation for the past 1000 hours. What is the probability that the chip will be in operation for another 6000 hours? (b) After 7000 hours of operation, what is the probability that the chip will not fail for another 2000 hours?	[5]	4	3
Q.5(a)	Describe the process of validation for model Input-Output transformation in detail.	[5]	5	3
Q.5(b)	Explain the terms face validity, calibration and goodness-of-fit in the context of model validation.	[5]	5	2

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