

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

B.Tech-IV Semester (CSE/IT)

COURSE CODE (CREDITS): 18B11CI413 (3)

MAX MARKS: 35

COURSE NAME: Modeling and Simulation Techniques

COURSE INSTRUCTOR: EMP

MAX. TIME: 2 Hours

*Note: (a) All questions are compulsory.**(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems**(c) Use of nonprogrammable scientific calculator is allowed*

Q.No	Question	CO	Marks								
Q1	What is a Pseudo Random Number Stream? Mention any two applications in simulation.	CO5	2								
Q2	Differentiate between Estimation and Statistical Testing. Explain their importance in simulation studies.	CO2	3								
Q3	Explain the importance of Data Collection in Modeling and Simulation. Discuss the types of data required, methods of data collection, and the impact of accurate and inaccurate data on the effectiveness of simulation models. Illustrate your answer with suitable examples.	CO5	4								
Q4	Describe the methodology of Discrete-Event Simulation (DES). Illustrate with a simple example.	CO3	4								
Q5	Discuss various Modeling Methodologies and Tools used in simulation studies. Compare analytical models and simulation models with suitable examples.	CO4	5								
Q6	A simulation study generated the following pseudo random numbers: 0.15, ; 0.72, ; 0.48, ; 0.84, ; 0.31 If the probability distribution is: <table border="1"> <tr> <td>Event</td><td>A</td><td>B</td><td>C</td></tr> <tr> <td>Probability</td><td>0.30</td><td>0.50</td><td>0.20</td></tr> </table> Assign the events to each random number using the cumulative probability method.	Event	A	B	C	Probability	0.30	0.50	0.20	CO5	5
Event	A	B	C								
Probability	0.30	0.50	0.20								

Q7	A manufacturing company records the daily number of defective items produced over 20 days as follows: <table><tr><td>Number of Defects</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Frequency</td><td>2</td><td>5</td><td>6</td><td>4</td><td>2</td><td>1</td></tr></table> The management believes that the data may follow a Poisson Distribution. Using the given data: A. Calculate the mean number of defects. B. Fit a Poisson distribution to the data. C. Compute the expected frequencies for each number of defects.	Number of Defects	0	1	2	3	4	5	Frequency	2	5	6	4	2	1	CO2	6
Number of Defects	0	1	2	3	4	5											
Frequency	2	5	6	4	2	1											
Q8	Discuss the major difficulties encountered during Verification, Validation, and Accreditation (VV&A) of simulation models. What is meant by White-Box Validation and Black-Box Validation? Explain any four validation techniques in detail.	CO6	6														