



BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Tech.(CSE)-DS-2021
Course Name – Data Modeling and Simulation
Course Code - PEC-CSD602B
(Semester VI)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Choose the random variate from following in the context of data modeling.
- a) A constant value
 - b) A variable generated using a deterministic algorithm
 - c) A variable generated using a random process
 - d) A predefined database attribute
- (ii) Choose the correct purpose of the inverse transform method in random variate generation.
- a) To transform deterministic data
 - b) To transform non-uniform distributions to uniform distributions
 - c) To transform non-uniform distributions to uniform distributions
 - d) To transform discrete data to continuous data
- (iii) Identify which of the following best describes human intelligence?
- a) Ability to perform tasks using computers
 - b) Capacity for logic, understanding, learning, and problem-solving
 - c) Mastery of programming languages
 - d) Aptitude for physical strength and agility
- (iv) Select which technique involves training algorithms to learn from data and make predictions or decisions without being explicitly programmed?
- a) Supervised learning
 - b) Unsupervised learning
 - c) Reinforcement learning
 - d) Deep learning
- (v) Select which statistical test is appropriate for comparing means of two independent groups?
- a) Chi-square test
 - b) T-test
 - c) ANOVA
 - d) Mann-Whitney U test
- (vi) Select which statistical test is used to determine whether there is a difference between proportions in two independent groups?
- a) Chi-square test
 - b) T-test

- c) ANOVA
 (vii) Choose the correct purpose of defining dependencies between events in event scheduling.
 a) To ensure events occur in a specific order
 b) To increase data redundancy
 c) To decrease data processing speed
 d) None of the above
- (viii) Choose the proper option for describing the process of assigning resources to events in event scheduling.
 a) Allocation mapping
 b) Dependency mapping
 c) Resource allocation
 d) Event mapping
- (ix) Write the proper role of stakeholder involvement plays in building valid simulation models.
 a) It is unnecessary for model credibility.
 b) It ensures models remain static and inflexible.
 c) It provides insights and validation opportunities.
 d) It creates bias in the modeling process.
- (x) Choose the correct fundamental technique for increasing model validity and credibility in data modeling.
 a) Using biased data sources
 b) Relying solely on intuition for model design
 c) Incorporating diverse and relevant data sources
 d) Ignoring model documentation
- (xi) In a simulation study comparing two algorithms, identify the option that is a common measure to assess the difference in their performance.
 a) Standard deviation
 b) Mean square error
 c) Effect size
 d) Range
- (xii) Select the correct option for a statistical procedure that is robust to violations of normality and equal variances assumptions.
 a) ANOVA
 b) Tukey's HSD test
 c) Welch's t-test
 d) Kruskal-Wallis test
- (xiii) When comparing the medians of two independent groups with non-normally distributed data, select the test that is suitable.
 a) Paired t-test
 b) Wilcoxon signed-rank test
 c) Independent samples t-test
 d) Mann-Whitney U test
- (xiv) When comparing the means of more than two groups with unequal sample sizes and variance, select the suitable test that can be used.
 a) Independent samples t-test
 b) Paired t-test
 c) Welch's ANOVA
 d) Kruskal-Wallis test
- (xv) Select the correct aspect of simulation that SIMLIB primarily focuses on.
 a) Data preprocessing
 b) Model validation
 c) Event-driven simulation
 d) Machine learning algorithms

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Explain conditional probability. (3)
3. Describe the benefits of data modeling simulation? (3)
4. Define Random Number. (3)
5. Define Time-Shared Computer Model (TSCM). (3)
6. Explain the difference between a population and a sample. (3)

OR

Explain what is the mean of a dataset? (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain the process by using that SIMLIB handles the concept of time in a single-server queue simulation. (5)
8. Summarize the significance of the Uniform Distribution in data modeling. (5)
9. Explain the term simulation clock in data modeling and simulation. Discuss its purpose in detail. (5)
10. Illustrate the process of contribution of event scheduling to the efficient management of resources in complex systems. (5)
11. Describe the conceptual stages of simulation modeling? (5)
12. Describe some key aspects and steps involved in using Discrete Event Simulation (DES) for data modeling and simulation. (5)

OR

Explain the key characteristics of the simulation clock in data modeling and simulation. (5)
