(3 Hours) [Total marks: 80]

Note (1) Question No. 1 is compulsory.
(2) Attempt any four out of remaining six questions.
(3) Answer to sub-questions should be grouped together.

Q1. (a) Write short notes on the following (Any Three) 12
1. Data partitioned parallelism
2. KDD Process
3. Neural network
4. Star Schema

(b) Differentiate between (Any Two) 8
1. Parallel & distributed databases
2. Data warehouse Vs data mart
3. OID Vs URL
4. Supervised Vs Unsupervised learning

Q2. (a) What is multidimensional data cube of hyper cube? How slice and dice technique fits into this model? 7

(b) Explain architecture of distributed DBMS. 8

Q3. (a) What is frequent itemsets? What is apriory property? Describe an algorithm for finding frequent itemsets. 7

(b) Explain asynchronous replication process in detail. 8

Q4. (a) List the characteristics of XML. Explain XML documents and databases. 7

(b) Explain agglomerative algorithm of clustering in detail with an example. 8

Q5. (a) What is data warehouse? Why is it needed? Explain ETL process in detail. 7

(b) Describe collection hierarchies. How do they differ from inheritance? 8

Q6. (a) What are 3 lock management schemes in DDBMS? Explain in detail with example. 7

(b) What is classification technique? Explain decision tree in detail. 8

Q7. (a) Compare MOLAP & ROLAP. 7

(b) Explain Atomic types, structured types and reference types in ORDBMS. 8

Sem-IV - CBSGS.

Q. P. Code: 34872

[Time: 3 Hours] **[Marks: 80]**

Please check whether you have got the right question paper.

N.B: (1) Q.1 is compulsory.
(2) Attempt any four out of remaining six.
(3) Figures to the right indicate full marks.

Q1 A) Explain in detail Simulation application in anyone of the following system: [10]
(i) Job flow analysis at a Job Shop for Repair Jobs
(ii) Customer flow analysis at an Airport.
(iii) Cash Counter Analysis in Bank

B) A recent survey indicated that 82% of single women aged 25 years old will be married in their lifetime. Using binomial distribution, find the probability that two or three women in a sample of twenty will never be married. [06]

C) Define the following terms used in simulation: [04]
a) Discrete System b) Continuous System c) Stochastic System d) Deterministic System

Q2 A) A baker is trying to figure out how many dozen cakes to bake each day. Currently the baker bakes sixteen dozen cakes per day. [08]
The probability distribution of the number of cake customers is as follows:
Table 1: probability distribution for the number of cake customer per day

No of customers per day	8	10	12	14
Probability	0.35	0.30	0.25	0.10

Each customer orders on average 1, 2, 3, or 4 dozen cakes according to the following probability distribution:

Table 2:probability distribution for the number of cakes, in dozens, ordered per customer

No of dozen Cakes ordered Per customer	1	2	3	4
Probability	0.4	0.3	0.2	0.1

Cakes sell for $8.40 per dozen. They cost S 5.80 per dozen to make. All cakes not sold at the end of the day are sold at half-prize to a local grocery store. Run a 5-day simulation of cake sale at the bakery and n the basis of it compute.
a) Average Net Profit (or may be Net Loss) in dollars made by the baker over the 5 day period.
b) Maximum Net Profit (or may be Minimum Net Loss) in dollars over the 5 days
c) Minimum Net Profit (or may be Maximum Net Loss) in dollars over the 5 days.

Make use of the below random number sequences for generating number of cake customers per day and number of cakes ordered, in dozens, per customer, respectively:

Random No Sequence for generating number of cake customers per day	0.70, 0.38, 0.01,0.66, 0.51
Random No Sequence for generating number of cakes ordered, in dozens, per customer:	.54, 0.04, 0.44, 0.88, 0.34

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B) Explain in brief the general characteristics of Queueing Systems and some of the long run measures of performance used in evaluating Queueing systems through simulations.

Q.3 A) Use Inverse Transform technique to develop a random-variate generator for random variable X having exponential distribution with parameter λ. Suppose that the life of a computer IC is exponentially distributed with mean 4. Generate four lifetimes from this distribution where R1 = 0.002, R2 = 0.808, R3 = 0.023, and R4 = 0.643.

B) Explain and illustrate with diagram the steps to be followed to conduct a sound simulation study. [

Q.4 A) The sequence of numbers 0.54, 0.73, 0.98, 0.11, and 0.68 has been generated. Use the Kolmogorov- Smirnov test with a=0.05 and critical value: $D_K = 0.565$ to determine if the hypothesis that the numbers are uniformly distributed on the interval [0,1] can be rejected. [0

B) Explain the concept of "Goodness of Fit" and the purpose of statistical methods devised to test "Goodness of Fit" in the context of simulation modeling? Roughly illustrate the steps involved in applying Chi-Square test to measure the "Goodness of Fit" of a data set for a particular distribution. [07

Q.5 A) Use the mixed congruential method to generate a sequence of three two-digit random integers and corresponding random numbers with $Xo = 13$, $a = 9$, c = 35, and $m = 25$. 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]? [08

B) Illustrate and explain the iterative process of model building, verification and validation with a suitable diagram. [07

Q.6 A) Explain Poisson Process. Prove that if arrivals occur according to Poisson Process with mean rate A then time between arrivals are exponentially distributed and independent with mean 1/ A. [08]

B) The number of Hurricanes hitting the coast of Indian follows Poisson distribution with mean a=0.8 per year. Determine: [07]
i) The probability of more than two hurricanes in a year
ii) The probability of more than one hurricane in a year

Q.7 A) Write short notes on: (i) Input Modelling (ii)Time-Series Input Models. [08]

B) A medical examination is given in 3 stages by physician. Each stage is distributed with a mean service time of 20 minutes. Find the probability that the complete examination takes 50 minutes or less. Also compute the expected length of the complete examination. [07]

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