

Instructions

- 1. Question ONE is compulsory
- 2. Attempt any three out of remaining five questions.
- 3. Assume appropriate data and state your reasons
- 4. Marks are given right of the every question

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- 1(a) Differentiate between Exhaustive and Effective testing 5M
 - 1(b) Define the following with example. 5M
 - i) Failure ii) Fault iii) Error
 - 1(c) Explain Life cycle of a bug. 5M
 - 1(d) Differentiate between CFG and DFG. 5M
 - 2(a) A program reads an integer number within the range [1,100] and determines whether it is a prime number or not. Design the test cases for this program using boundary value analysis. 10M
 - 2(b) Justify how mutation testing is effective to check the quality of software with an example. 10M
 - 3(a) Draw the control flow graph and find the cyclomatic complexity for a program largest of three numbers. 10M
 - 3(b) Explain the different types of Incremental Integration Testing Methods. 10M
 - 4(a) Briefly explain prioritization techniques. 10M
 - 4(b) What is the need of software measurement? Explain different size metrics. 10M
 - 5(a) Create a case study on application of ISO 9000 framework to an educational institute. 10M
 - 5(b) Explain the guidelines for automated testing. 10M
 - 6. Write Short notes on
 - (a) Issues in Object Oriented Testing. 5M
 - (b) STLC. 5M
 - (c) Challenges in Testing Data Ware house. 5M
 - (d) Test Suite Minimization Problem. 5M

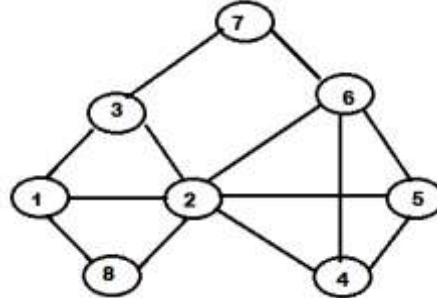
Time: 3 Hours

Marks: 80

Instructions:

- 1) Q.1. is compulsory
- 2) Attempt any three from the remaining
- 3) Assume suitable data

- Q.1. (a) Explain Blooms filter for stream data mining. (5)
 (b) Find the jaccard distance and cosine distance between the following pairs (5)
 of set: $X=(0,1,2,4,5,3)$ and $Y=(5,6,7,9,10,8)$.
 (c) Explain the steps of the HITS algorithm. (5)
 (d) Explain “Shuffle & Sort” phase and “Reducer Phase” in Map Reduce. (5)
- Q.2. (a) Write a Map reduce pseudo code to multiply two matrices. Illustrate with (10)
 an example showing all the steps.
 (b) Explain Hadoop Ecosystem with core components. Explain its physical (10)
 architecture. State the limitations of Hadoop.
- Q.3. (a) Suppose a data stream consists of the integers 1,3,2,1,2,3,4,3,1,2,3,1. Let (10)
 the Hash function being used is $h(x) = (6x+1) \bmod 5$; estimate the number
 of distinct in this stream using Flajolet - Martin algorithm.
 (b) Distinguish the following: (10)
 a) PCY, Multistage
 b) Document data store and Column family data store
- Q.4. (a) Give two applications for counting the number of 1’s in a long stream of (10)
 binary values. Using a stream of binary digits, Illustrate how DGIM will
 find the number of 1’s.
 (b) For the given graph show how clique percolation method will find cliques. (10)



- Q.5. (a) Consider the web graph given below with six pages (A, B, C, D, E, F) (10)
 with directed links as follows.
 $A \rightarrow B, C$
 $B \rightarrow A, D, E, F$
 $C \rightarrow AF$
 Assume that the PageRank values for any page m at iteration 0 is $PR(m)=1$
 and teleportation factor for iterations is $\beta=0.85$. Perform the page rank
 algorithm and determine the rank for every page at iteration 2.
 (b) Explain clearly how the SON partition based algorithm helps to perform (10)
 frequent item set mining for large data sets. How does this algorithm avoid
 false negatives?
- Q.6. (a) Explain collaborative filtering system. How is it different from content (10)
 based system?
 (b) Clearly explain how CURE algorithm can be used to cluster big data sets. (10)

(3 Hours)

Max. Marks: 80

- N.B.:** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **Three** questions out of remaining **Five** questions.
 (3) **Figures** to the **right** indicate **full** marks.
 (4) Assume suitable data if **necessary**.

- Q.1 a Explain with neat diagram supervised and unsupervised learning in NN **5**
 b Explain different activation functions in NN **5**
 c Explain with example any 2 operators involved in simple GA **5**
 d Explain different defuzzification techniques. **5**

- Q.2 a Design Hebb Net to implement logical AND function. Use bipolar inputs and targets. **10**
 b Explain Error back propagation training Algorithm with the help of flowchart. **10**

- Q.3 a Explain architecture of Bidirectional Associative Memory (BAM). How storage and retrieval performed in BAM. **10**
 b Explain the single layer Neural Network architecture using Perceptron model with suitable activation function. **10**

Q.4 a Two fuzzy relations are given by **10**

		b1	b2	b3
R	a1	0.4	0.5	0
	a2	0.2	0.8	0.2

		c1	c2
S	b1	0.2	0.7
	b2	0.3	0.8
	b3	1.0	0.0

Find T as a max-min composition and max-product composition between the fuzzy relations.

- b Sketch the 5 layer ANFIS architecture mentioning the task of each layer. **10**
- Q.5 a Using Mamdani fuzzy model, Design a fuzzy logic controller to determine the wash time of domestic washing machine. Assume that the inputs are dirt and grease on cloths. Use 3 descriptors for each input variables and five descriptors for output variables. Derive necessary membership function and required fuzzy rules for the application. **15**
 b Explain Mamdani's and Zadeh's interpretation of fuzzy rule. **5**

- Q.6 Write Short Note on: **5**
 a Explain perceptron convergence theorem **5**
 b Binary Hopfield Network **5**
 c Delta Learning Rule **5**
 d McCulloch Pitts neuron model **5**

(3 hours)

[80 marks]

NOTE: Question No 1 is compulsory. Attempt any three questions from remaining.

Assume suitable data if necessary.

Draw neat labelled diagrams wherever needed.

Q1.

a. Design and implement ILM for Storage Management system. **10 Marks**

b. Consider a disk I/O System in which I/O request arrives at the rate of 80 IOPS.

The Disk Service Time is 6 ms.

Compute the following

1. Utilization of IO controller
2. Total Response Time
3. Average Queue Size
4. Total time spent by a request in a queue

10 Marks

Q2 a. An application has 1,000 heavy users at a peak of 2 IOPS each and 2,000 typical users at a peak of 1 IOPS each, with a read/write ratio of 2: 1 . It is estimated that the application also experiences an overhead of 20 percent for other workloads. Calculate the IOPS requirement for RAID 1, RAID 3, RAID 5, and RAID 6.. **10 Marks**

b. Explain FC Protocol Stack and FC SAN topologies. **10 Marks**

Q3 a. Explain in detail the different components required to design Intelligent Storage System. **10 Marks**

b. Explain BC planning lifecycle with an example. **10 Marks**

Q4 a. Explain IP Storage standards. **10 Marks**

b. Explain Multilingual retrieval systems. **10 Marks**

Q5 a. Explain different components of information system and its types. **10 Marks**

b. Explain Network Data Management Protocol (NDMP) **10 Marks**

Q6 Write a short note on **20 Marks**

- a) IP Storage
- b) NAS
- c) Stemming
- d) Symmetric and Asymmetric virtualization

(3 Hours)

[Total Marks: 80]

N.B.: (1) Question No.1 is Compulsory.

- (2) Attempt **any three** questions from **remaining** questions.
- (3) Assume **suitable** data wherever required but **justify** the same.
- (4) **Figures** to the **right** indicate **full marks**.
- (5) Answer to each new question to be started on a **fresh page**.

1. (a) Define Simulation. Explain when simulation is an appropriate tool and when it is not. (10)
- (b) Explain Naylor and Finger approach for validation of model. (10)

2. (a) Calculate the output statistics for the queueing system whose inter-arrival and service times for ten arrivals are given below: (10)

Inter-arrival time	--	1	1	6	3	7	5	2	4	1
Service time	4	2	5	4	1	5	4	1	4	3

- (b) Describe the Event scheduling / Time advance algorithm. Give the system snapshots. (10)

3. (a) A car wash facility washes cars in four steps- soap, rinse, dry, and vacuum performed by one worker. The duration of each step is exponentially distributed with a mean of 9 minutes. A car has to finish with all the four steps to enable the next car to begin the process. Find the probability that the car wash will take 30 minutes or less. Also, compute the expected length of the wash and the modal value. (10)

- (b) Using direct transformation technique, design a generator for normal and lognormal distribution. (10)

4. (a) Test the following random numbers for independence by runs up and runs down test. (10)
Take $\alpha = 0.05$ and the critical value $Z_{0.025} = 1.96$.
{0.21,0.17,0.13,0.26,0.33,0.13,0.02,0.34,0.18,0.22}

- (b) Explain Inventory system. Discuss the cost involved in inventory systems. (10)

5. (a) Give the equations for steady state parameters of M/G/1 queue and derive M/M/1 from M/G/1. (10)

- (b) The following data were available for the past 10 years on demand and lead time. (10)

Lead time	4.3	6.5	6.3	4.5	7.3	5.8	6.9	6.9	6.0	6.9
Demand	83	103	96	92	109	106	104	112	97	116

Estimate correlation and covariance.

6. Write short notes on **(any two)**: (20)

- (a) Goals and Issues in simulation of manufacturing systems.
- (b) Poisson Process and its properties.
- (c) Steps in simulation study.
- (d) Output analysis for terminating simulation.