

PC

QP Code : 17403**(3 Hours)****[Total Marks : 80**

Note. (1) Question No. 1 is compulsory

(2) Attempt any three questions from remaining questions

(3) Draw suitable diagrams wherever necessary

(4) Assume suitable data, if necessary.

- Q 1 (a) Compare the performances of producing minimum spanning tree using prim's and Kruskal's parallel algorithms with the help of an example. 10
- Q 1 (b) Discuss different performance metrics and the components effecting the metrics for parallel systems. 10
- Q 2 (a) Explain different methods for minimizing the interaction overhead with sparse matrix multiplication example. 10
- Q 2 (b) Define Task dependency Graph, Task Interaction Graph, Critical Path with Dense and sparse matrix multiplication example. 10
- Q 3 (a) Discuss shared memory programming model for UNIX OS with respect to 10
- i. Process Creation
 - ii. Process Destruction
 - iii. Shared Memory Allocation
 - iv. Synchronization Primitives
- Q 3 (b) Explain causes, detection, avoidance and resolution of pipeline hazards? 10
- Q 4 (a) What is parallel algorithm? Explain different parallel algorithm models 10
- Q 4 (b) Explain cache coherence problem in multiprocessor systems and the methods to resolve the problem. 10
- Q 5 (a) Explain row wise 1-D & 2-D partitioning parallel algorithm for Matrix-Vector Multiplication. 10
- Q 5 (b) Explain Instruction pre fetching and Data dependency hazards for a pipeline processor 10
- Q 6 (a) Explain systolic architectures, their advantages and disadvantages 10
- Q 6 (b) Explain the architecture and the programming model of PVM 10

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

(2) Answer any **three** questions from the remaining **five** questions.

(3) **All** questions carry **equal** marks.

(4) **Figures** to the **right** indicate **full** marks.

(5) Make **suitable** assumptions wherever **necessary** and justify them.

1. (a) Give the analysis of quick sort algorithm using recursion. 10
- (b) Explain masters theorem. Solve the recurrence given below using Masters theorem 5

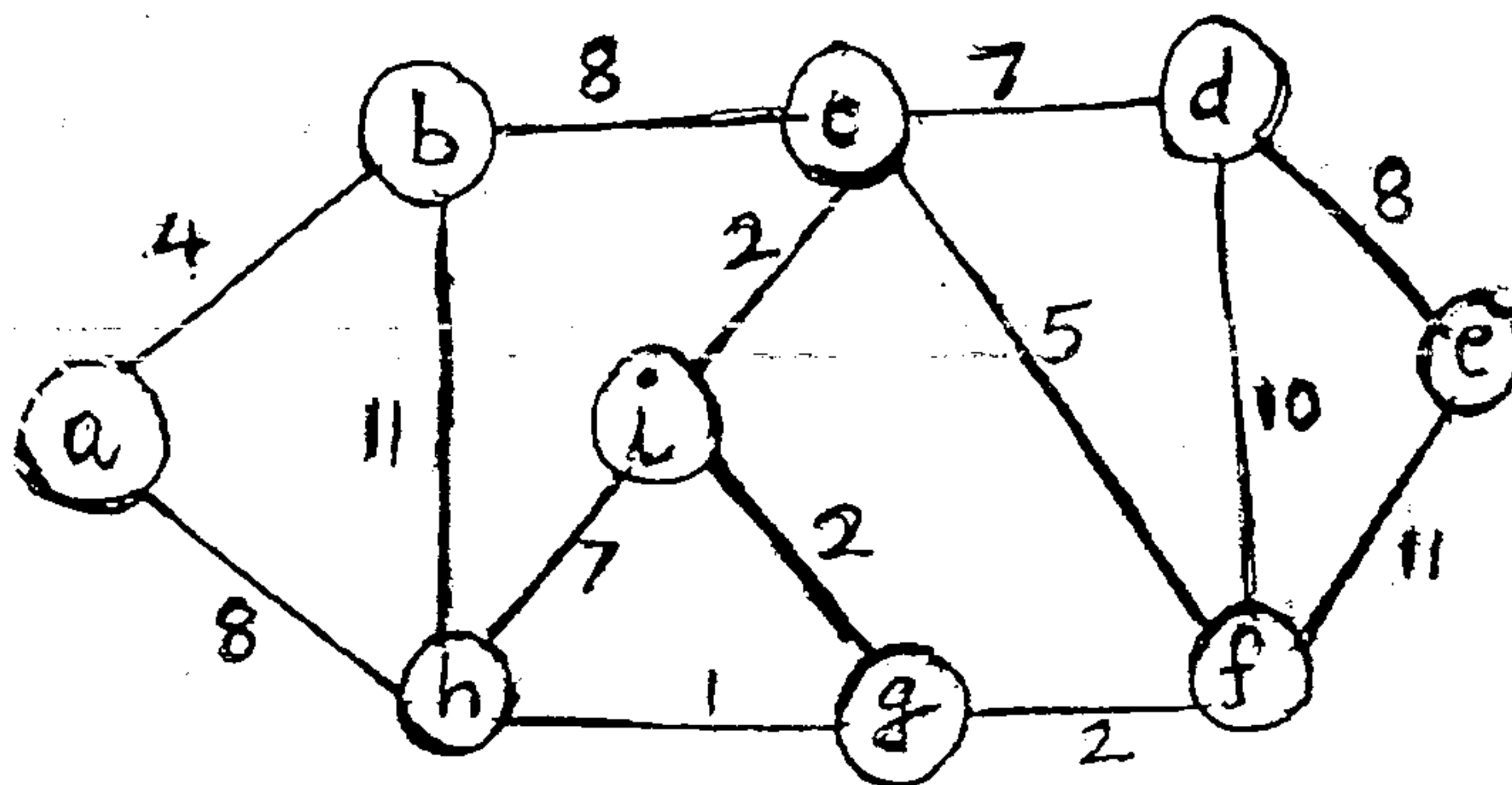
$$T(n) = 4T(n/2) + n^2$$
- (c) Explain Ω , O , θ , ω , o with an example. 5

2. (a) Prove that set cover is NP-complete. 10
- (b) Determine a longest Common Subsequence (LCS) of $\langle abcaabcdad \rangle$ $\langle aabbccdabd \rangle$. 10

3. (a) Find all pairs shortest path for the given weight matrix. 10

$$\begin{bmatrix} 0 & \infty & 6 & -3 & \infty \\ 5 & 0 & \infty & \infty & \infty \\ \infty & \infty & 0 & \infty & \infty \\ \infty & 3 & 1 & 0 & \infty \\ \infty & 4 & \infty & 2 & 0 \end{bmatrix}$$

- (b) Use Prim's algorithm to find the (MST) minimum spanning tree for the following graph. 10



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4. (a) Explain Bellman Ford algorithm with an example. 10
(b) Find an optimal parenthesization of a matrix chain product whose sequence of dimensions is $\langle 10, 15, 5, 10, 20 \rangle$ 10
5. (a) Solve the following linear program using simplex method 10
Maximize $4x_1 + 2x_2 + 3x_3$
Subject to $x_1 + x_2 + 2x_3 \leq 40$
 $2x_1 + 2x_2 + 5x_3 \leq 30$
 $4x_1 + x_2 + 2x_3 \leq 50$
 $x_1, x_2, x_3 \geq 0$
- (b) Explain Rabin Karp string matching algorithm in detail. 10
6. Write short note on :- 20
(a) Linear Programming
(b) Approximation algorithm for TSP
(c) Genetic algorithm
(d) K-server.
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(Time: 3 hours)

(Total Marks: 80)

1. Question No 1 is compulsory.

2. Attempt any three out of the remaining five questions.

- Q1. (a) A virtual university currently has 5 departments of engineering housed in one building with six floors, one floor dedicated to each branch. Each department has different laboratories with each one catering to around 50 students simultaneously. The server room, library and office are on the ground floor. The University plans to expand its streams and two additional buildings are planned in the same campus at a distance of 1 km each from the existing building, for Polytechnic and Pharmacy. The laboratory structure of each floor in the new buildings would be similar. The university has been granted the IP address 130.56.0.0 via a 10 Mbps leased line. Design subnets so that each building is assigned a different subnet. Private IP addressing can be used for providing logical separation between the different departments. Give the design details for the backbone layer, distribution layer and access layer. Include the details for IP-addressing in your design. As an upgradation in future, the University proposes to start online multimedia classes for all students in the pharmacy wing. What enhancements would you propose to the existing design? 16
- Q 1 (b) Define throughput and latency. What are the propagation and transmission delays for a 5Mbyte message if the bandwidth of the network is 1Gbps? Assume distance between sender and receiver is 12,000 km and light travels at 2.4×10^8 m/sec. 04
- Q2. (a) What are the different steps of top-down network design? List typical technical goals and business goals. 10
- Q2.(b) Discuss the key features of each layer in Cisco's 3 layered network design model. 10
- Q3 (a) What is SNMP? Discuss the major changes that were introduced in SNMPv2. 10
- Q3 (b) Explain in detail SMI and MIB. Discuss their structural differences. 10
- Q4. (a) What are the challenges of a network manager? How are fault management and performance management handled by an NMS? 10

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Q4 (b) Table given in figure below shows the output of a network management system detailing the addresses of a router in a network. Draw the following request-response messages to retrieve all columnar objects of the Address Translation group. Assume that you know the number of rows in the table making requests.

10

INDEX	IP ADDRESS	PHYSICAL ADDRESS
3	172.46.41.1	00:00:0c:35:C1:D2
4	172.46.42.1	00:00:0c:35:C1:D3
5	172.46.43.1	00:00:0c:35:C1:D4
6	172.46.44.1	00:00:0c:35:C1:D5
2	172.46.63.1	00:00:0c:35:C1:D1
7	172.46.165.1	00:00:0c:35:C1:D8
1	172.46.252.1	00:00:0c:35:C1:D0

- i. Get-next request and response
- ii. Get-bulk-request and response
- iii. Compare results of i) and ii)

Q5 (a) What is the relevance of queuing theory in network design? On a network router, measurements show that packets arrive at a mean rate of 120 packets per sec. The router takes about 2 msec to forward a packet. Assuming M/M/1 queuing model calculate the router utilization and mean number of packets in the router. For what percentage of time would the router be idle? What is the probability of buffer overflow if the router has only four buffers?

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Q5 (b) What is remote monitoring? Discuss RMON1 groups and functions.

10

Q6. Short notes on: (any two)

- i) SNMP community profile and access management.
- ii) TMN functional architecture
- iii) Ethernet Design rules and scalability constraints
- iv) Netflow and Syslog

20

- N. B. :** (1) Question No 1 is **Compulsory**.
(2) Solve any **three** out of **five** remaining questions.

1. (a) Explain the role of client and server stub procedures in RPC. 5
(b) Explain the distributed garbage collection. 5
(c) Explain about the CORBA architecture in detail. 5
(d) What are digital signatures & certificates. 5
 2. (a) Discuss the possibilities of transaction conflicts happening during read and write operations. 10
(b) Discuss asymmetric (public/private key pair-based) cryptography technique and how it can be used in supporting security in distributed systems. 10
 3. (a) Explain relevance of co-ordinator in a distributed system. Explain election algorithms. 10
(b) What is distributed transactions. Explain its types. 10
 4. (a) Explain distributed file system Architecture. 10
(b) Explain Java RMI and its architecture. 10
 5. (a) Explain how the time-stamp approach helps in overcoming the lost-update problem. 10
(b) What is distributed mutual exclusion? How to achieve it? 10
 6. Explain the following :-
 - (a) Andrew file system. 10
 - (b) Edge chasing algorithms. 10
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Duration : 3 hours

Total marks : 80

- Note. (1) Attempt any four questions.
 (2) Draw suitable diagrams wherever necessary.
 (3) Assume suitable data, if necessary.

- Q 1 (a) What is overfitting? What are the effects? Explain the methods to control it. 10
- Q 1 (b) Design a Perceptron based neural network to implement NAND (not AND) function 10
- Q 2 (a) Explain concept learning as a search through a hypothesis space. 10
- Q 2 (b) Using the table given below, create a classification model using Bayesian techniques. Indicate how to utilize the model to estimate the risk category of the customer with $P(X|C_j) = p \{ \text{Yes, No, female, yes, A} \}$ 10

Owns Home	Married	Gender	Employed	Credit Rating	Risk Class
Yes	Yes	Male	Yes	A	B
No	No	Female	Yes	A	A
Yes	Yes	Female	Yes	B	C
Yes	No	Male	No	B	B
No	Yes	Female	Yes	B	C
No	No	Female	Yes	B	A
No	No	Male	No	B	B
Yes	No	Female	Yes	A	A
No	Yes	Female	Yes	A	C
Yes	Yes	Female	Yes	A	C

- Q 3 (a) Explain K-nearest neighbor learning and the need for choosing $K > 1$. 10
- Q 3 (b) You are given the problem to evolve a binary string of length 'm' that is a *palindrome*. The initial population of chromosomes (hypotheses) is generated randomly, each chromosome being of length 'm'. 10
- Define an appropriate fitness function.
 - Would you use a one point or two points cross over operation? Do you need any special modification to the cross over operation?
 - What would be the impact of mutation? Will it be helpful or harmful in finding a solution?
- Q 4 (a) Explain K-means algorithm. Perform clustering for $K = 2$ for the following data 10
 $\{ 2, 4, 10, 12, 3, 20, 30, 11, 25, 5, 22, 14 \}$
- Q 4 (b) Differentiate regression and classification. Explain logistic regression with an example. 10

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Q 5 (a) Compare ID3 algorithm with Bayesian Classification. 10

Q 5 (b) Assume that the database D is given by the table below. Follow single link technique to find clusters in D. Use Euclidian Distance measures. Also draw the dendogram. 10

Database – D

	X	Y
P1	0.40	0.53
P2	0.22	0.38
P3	0.35	0.32
P4	0.26	0.19
P5	0.08	0.41
P6	0.45	0.30

Q 6 Write short notes on any 4 20

1. EM for soft clustering
2. Parallizing genetic algorithm
3. Problems in NN learning
4. Parameter Smoothing
5. Concept representation

MCA COMPN I (CIS)

Software Testing

QP Code : **17406**

(3 Hours)

[Total Marks : 80

- N.B. :** (1) Question No. **1** is **compulsory**.
(2) Answer any **three** from remaining **5** questions.

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|--------|---|----|
| 1. (a) | Discuss the cost of testing. | 10 |
| (b) | What are the issues and challenges in software testing. | 10 |
| 2. (a) | Draw V model and state the testing required at each level. | 10 |
| (b) | What are test factors ? Explain test strategy. | 10 |
| 3. (a) | What kind of errors are detected in static testing ? | 5 |
| (b) | Prepare a check list for code review. | 5 |
| (c) | Do "date" validation using code coverage. | 10 |
| 4. (a) | Explain any three black box techniques. | 10 |
| (b) | How would you do integration testing ? What are stubs and drivers ? | 10 |
| 5. (a) | Categorize the testing methods for testing web based applications. | 10 |
| (b) | What are the different factors governing performance testing ? | 5 |
| (c) | Draw the penetration test matrix for security testing. Assume scenarios. | 5 |
| 6. (a) | What is path testing ? What are the different ways of finding code complexity ? | 10 |
| (b) | What are the factors to be considered for selecting test tools ? | 10 |

ME/CMPN/I CBUS. 17/12/14.
E. Business Technology

QP Code : **17421**

(3 Hours)

[Total Marks : 80

N. B. : (1) Question No. 1 is **compulsory**. Answer any **three** question from the remaining.

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| 1. | (a) Identify and explain fundamental models of e-business. | 10 |
| | (b) Explain Revenue models for web portals and virtual communities. | 10 |
| 2. | (a) What is difference between business plan and business model? | 10 |
| | (b) What is value chain? Describe primary activities in the value chain. | 10 |
| 3. | (a) What are the five forces that influences firms competitive thinking? | 10 |
| | (b) Write short note on E-business research process. | 5 |
| | (c) Explain the taxonomy for e-business. | 5 |
| 4. | (a) What are different entihal and social issues in E-business? | 10 |
| | (b) Explain customer oriented trends which drives E-business. | 5 |
| | (c) Write short note on organizational and managerial issues. | 5 |
| 5. | (a) Explain various online payment systems. | 10 |
| | (b) Compare various web hosting techniques. | 10 |
| 6. | Write short note on :- | 20 |
| | (a) Ethical decision making process | |
| | (b) E-business opportunities. | |
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ME Computer Science I CBGS 11/12/2014
Advanced Database Design

QP Code 17412

(3 Hours)

[Total Marks : 80

N.B. : (1) Question No. 1 is **compulsory**.
(2) Solve any **three** from **remaining**.

1. (a) Design ODL Temporal Schema for Employee valid time relation. 5
(b) Explain OLAP operations. 5
(c) Explain ORDBMS. 5
(d) Explain BLOB and CLOB with examples. 5
2. (a) Design Star, Snowflake and fact constellation Enterprise Resource Planning and Management System schema. 10
(b) Give mapping for Company Database System EER schema into relational schema. 10
3. (a) Write ODL schema for Banking Database Management System. 10
(b) Explain 3-tier client server architecture in detail. 10
4. (a) Write any one data mining algorithm and solve the same with example. 10
(b) Explain conflict serializable and view serializable schedule. 10
5. (a) Let Account Schema =(branch_name, acc_no, balance). Fragment account relation horizontally and vertically into account₁ and account₂ with same branch name. 10
(b) Explain design and implementation issues in Mobile databases. 10
6. Write short note on any **two** of the following :- 20
 - (a) Active and Deductive Databases
 - (b) Triggers and Assertions
 - (c) Database Design Issues.
