M.E Sem I (Rev) Comp.
Advanced Algo & complexity

AGJ–2nd half (m)–12–12

Con. 9804–12.

(3 Hours)

[Total Marks : 80

N.B. : (1) Question No. 1 is **compulsory**.
    (2) Solve any **three** from the remaining **five** questions.
    (3) Assume **suitable** data wherever **necessary**.

1. (a) Explain Master's Method for solving recurrences to obtain asymptotic 'θ' or 'O' bounds.   10
     Solve the given recurrences relation $T(n) = 16T(n/4)$ tn^2 using Master's Method.
  (b) Write Merge sort algorithm and analyze it.   10

2. (a) Find all pairs shortest path for the given weight matrix using Floyd-Warshall algorithm.   10

$$W = \begin{array}{c|ccccc} & A & B & C & D & E \\ \hline A & 0 & 5 & 8 & \infty & -3 \\ B & \infty & 0 & \infty & 2 & 6 \\ C & 2 & \infty & 0 & \infty & \infty \\ D & 2 & \infty & -4 & 0 & \infty \\ E & \infty & \infty & \infty & 3 & 0 \end{array}$$

  (b) Using dynamic approach solve the following Knapsack problem (maximum profit).   10
     Knapsack capacity   M = 25
     Profit   P = (25, 23, 16)
     Weights W = (16, 10, 5)

3. (a) Solve the following Linear Programming using simplex method.   15
     Maximize $-5x_1 - 3x_2$
     Subject to $x_1 - x_2 \leq 1$
                $2x_1 + x_2 \leq 2$
                $x_1, x_2 \geq 0$
  (b) Prove that Travelling Sales person is NP-Complete.   5

4. (a) Determine LCS of (011010110) and (110010100).   10
  (b) Explain with example maximum bipartite matching using Ford-Fulkerson method.   10

5. (a) Prove that subset sum is NP-Complete.   10
  (b) Find the optimal solution for the given weight matrix using travelling sales person   10
     (dynamic programming).

$$\begin{array}{c|cccc} & A & B & C & D \\ \hline A & \infty & 11 & 6 & 7 \\ B & 11 & \infty & 12 & 6 \\ C & 4 & 8 & \infty & 10 \\ D & 11 & 3 & 1 & \infty \end{array}$$

6. Write short note on :–   20
    (a) Naive String Matching Algorithm
    (b) Genetic Algorithm
    (c) K-Server problem
    (d) Rabin Karp algorithm.

Con. 10666-12.

BB-8301

(3 Hours)

[Total Marks : 80

N.B.: Attempt any **four** questions.

1. (a) What are the different types of parallel algorithm models ? Explain them in detail 10 with example.

   (b) What is the need for decomposition ? List and explain various decomposition 10 techniques with examples.

2. (a) Discuss issues in parallel sorting. Also explain parallel Quick sort algorithm in detail. 10

   (b) What is message passing programming ? Explain in detail blocking and non-blocking 10 message passing operation.

3. (a) What is Cannon's algorithm for matrix multiplication ? Discuss performance analysis 10 of Cannon's algorithm.

   (b) Explain various mapping techniques for load balancing.   10

4. (a) Explain in detail classification of parallel computers.   10

   (b) Discuss different performance metrics for parallel systems.   10

5. (a) Explain general model for shared memory programming.   10

   (b) Explain in detail UMA and NUMA architectures.   10

6. Write a note on following (any **four**) :—   20
   (a) PVM – Parallel Virtual Machine
   (b) MPI – Message Passing Interface
   (c) High Performance JAVA
   (d) Grid Computing
   (e) Systolic Architecture.

Con. 10868–12.

BB–5898

(3 Hours)   [Total Marks : 80

NB   :   Attempt any for questions

Q1 (a) Before designing a new Network or upgrading to a enhanced network designer   10
should know the business & Technical challenges and requirements, explain
with example all these challenges and requirements ?

    (b) A Ethernet LAN with 10mbps transfers file of 1MB to another system. Calculate   10
frames per second with and without overhead? Explain how frame size affects
the frame rate?

Q2 (a) Explain Markovian Queuing System Model? And how it is help full to design the   10
network?

    (b) What is MTTR and MTBF? and how availability and reliability is calculated ?   10

Q3 (a) Explain different types of Topology used for backbone design?   10

    (b) Differentiate between design rule of Fast Ethernet, Gigabyte Ethernet & 10G   10
Ethernet

Q4 (a) What are functional blocks of Network Management?,   6

    (b) How performance evaluation is done in network management?   6

    (c) Explain & Compare SMNP v1,v2,v3   8

Q5 (a) Explain Functional architecture of TMN   10

    (b) What is MIB ? explain the structure of MIB   10

Q6   **Write Short Note on any 4(four) of following**   20

    (a) Various types of delays in Network

    (b) Source Model

    (c) Access layer

    (d) Tuning Network

    (e) RMON

    (f) Netflow, Syslog

Con. 10795–12.

BB–5910

(3 Hours)

[Total Marks : 80

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

(2) Out of remaining **five** questions, attempt any **three** questions

(3) Assume suitable data wherever **necessary**.

1. (a) What is distributed database ? Explain different types of transperencies in distributed database.   5

   (b) Explain database security in brief.   5

   (c) Explain OODBMS and ORDBMS.   5

   (d) Describe different steps in Data Mining.   5

2. (a) Explain 3-tier client server architecture in detail.   10

   (b) Explain deadlock detection, prevention and recovery in details.   10

3. (a) What is parallel database ? Explain the architecture of parallel database.   10

   (b) Consider the relation r (X, Y, Z, W) and a set F{Y $\leftrightarrow$ W, XY $\rightarrow$ Z}. Where   10
   the symbol $\leftrightarrow$ means that Y $\rightarrow$ W and W $\rightarrow$ Y simultaneously. What are the candidate key of this relation ? What is the highest normal form of this relation ?

4. (a) Consider the following relations ?   10

   Emp (eno, ename, title)

   Proj (pno, pname, budget, Loc)

   Pay (title, salary)

   Asg (eno, pno, resp, dur)

   (i) Write the query for primary horizontal fragmentation on proj relation on any two attribute. Write the resultant fragments.

   (ii) Give the derived horizontal fragmentation on Emp and Pay relation. Write the resultant fragments.

   (iii) Fragment the Emp and Proj vertically and wirte the resultant fragments.

   (b) Explain varray and nested tables.   10

5. (a) Design a star Schema and snowflake Schema for airline ticket reservation system.   10

   (b) Explain concurrency control in distributed database.   10

6. Wrtie a short note on : (any **two**) –   20

   (a) Multimedia database

   (b) OLAP operations with examples

   (c) Active and deductive database.

Con. 10822–12.

BB-8325

(3 Hours)

[Total Marks : 80

N.B. : Attempt any **four** questions.

1. (a) What are Dynamic Proxy and Dynamic Invocation Interface ?   5
   (b) Explain purpose of Enterprise Service BUS.   5
   (c) Explain Entity-Centric and Task Centric business service design in detail.   10

2. (a) Briefly explain about anatomy of Service Oriented Architecture.   5
   (b) List goals of Service-Oriented Analysis   5
   (c) Differentiate between RESTful WS and SOAP-WS.   5
   (d) Discuss the importance of semantic in SOA.   5

3. (a) How are switch, case and otherwise elements used in WS-BPEL ?   5
   (b) Explain details about WSDL language basics and its elements.   5
   (c) Which additional security benefits provide by WS-Security Standards Compare to SSL, to secure SOAP Message ?   5
   (d) Differentiate between Web Site and Web Services.   5

4. (a) Briefly explain about chôregraphy and its type.   5
   (b) Explain Service-Oriented Analysis Process. Use case-study of creating Web Services for Myhospital.com   10
   (c) Discuss SOA governance.   5

5. (a) Discuss about SOA v/s distributed internet architecture.   10
   (b) Explain RPC based and document based Web Service Calling. Explain advantage and disadvantage of both method, explain it with same scenarios.   10

6. Short notes :–   20
   (a) Service Contract
   (b) UDDI
   (c) SCM using SOA.

Con. 10551-12.

BB-6294

(3 Hours)

[**Total Marks : 80**

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

1. Virtual Technical University / V.T.U. is an urban university with four departments **20** housed in four separate buildings. The departments are Chemical Engineering, Computer Engineering, Electronics Engineering and Information Technology. The buildings are all within few hundred meters of each other. Each department has five laboratories spread out on different floors of its building. Currently only the Computer and I.T. departments have interact facility. The V.T.U. needs to upgrade its network as the governing body has sanctioned an additional intake of 400 students. The current network is a flat all bridged network. Both students and faculty complain about network connectivity and speed. The VTU has an automated attendance monitoring system to keep track of new registrations and student and faculty records. The chemical department needs facility to upload large graphic files to an off-campus print shop. The existing network needs to be upgraded to provide Internet connectivity to all departments and to cater to the additional intake. It is expected that within a span of 3 years, many more high bandwidth applications will be deployed.
    (a) Identify the business and technical goals.
    (b) Characterize and design the existing network.
    (c) Draw the enhanced network diagram.
    (d) List the different network applications.

2. (a) What is a backbone network ? Identify the important factors while selecting a **10** backbone network.

    (b) Discuss the common network problem and various challenges faced by an I.T. **10** manager to manage the network of an enterprise.

3. (a) Explain SNMP VI protocol and its application.
                                                                                    10
    (b) Compare 10 Base5, 10Base2, 10BaseT and 100BaseT of IEEE802.3 with respect **10** to scalability constraints.

4. (a) Discuss the role of SNMP proxy server.
                                                                                    10
    (b) Explain the role of RMON in network management system.
                                                                                    10

5. (a) Explain TMN functional architecture.
                                                                                    10
    (b) Explain M/M/1 queuing model.
                                                                                    10

6. Write short notes on (any **two**) :-
                                                                                    20
    (a) Fault and Accounting Management
    (b) Phases of Network Design
    (c) Network Management Standards.