MASTER OF SCIENCE IN COMPUTER SCIENCE
M.Sc.(CS)

1st SEMESTER

With Effect From 2007 – 08 Admitted Batch

MODEL QUESTION PAPERS

Chairman
Board of Studies
(2007-08)

Dept of Computer Science and Systems Engineering
College of Engineering
Andhra University
Visakhapatnam

MSCS 1.1   **Discrete Mathematical Structures**.
Model Paper
First Question is Compulsory
Answer any four from the remaining and All Questions carry equal marks
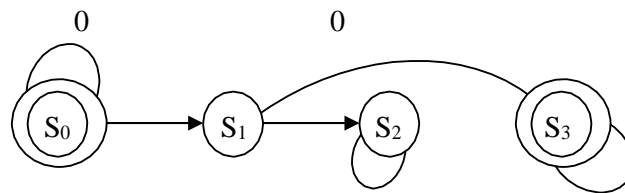Answer all parts of any Question at one place.

Time: 3 Hrs.   Max. Marks: 70

1. a). If φ denotes the empty net, write the elements of $PP\ (\varphi)$ Where P denotes the power set
   b). What is the lcm of $2^3\ 3^5\ 7^2$ and $2^4\ 3^3$?
   c). State well-ordering property
   d). State pegeon-hole principle
   e). Find the number of divisors of the number $3^5\ X\ 4^9$
   f).   Write the characteristic equation of the recurrence relation $a_n = -3a_{n-1} - 3a_{n-2} - a_{n-3}$
   g). What is the value of the post fix expression $7\ 2\ 3\ *-4\ \uparrow 9\ 3\ /+$?

2. a). Show that the function $f : Z^+\ X\ Z^+ \rightarrow Z^+$ defined by $f\,(m, n) = \dfrac{(m+n-2)(m+n-1)}{2} + m$ is
   one-one and onto
   b). Show that $(P \rightarrow q\ )\ \cap (P \rightarrow r)$ and $(P\quad q) \rightarrow r$ are logically equivalent

3. a). Prove that $^n c_r + \ ^n c_{r-1}\ = \ ^{n+1} c_r$
   b). How many bit strings of length four do not have two consecutive 1s? Explain.

4. a). Find the number of solutions of $e_1+e_2+e_3 = 17$, where e_1, e_2, e_3 are integers such that
   $2 \leq e_1 \leq 5,\ 3 \leq e_2 \leq 6$ and $4 \leq e_3 \leq 7$.
   a). Find the solution to the recurrence relation $a_n = 6a_{n-1} - 11a_{n-2} + 6a_{n-3}$ with $a_0 = 2,\ a_1 = 5$ and
   $a_2 = 15$.

5. a). Prove that, a connected multi graph has an Euler circuit if and only if each of its vertices
   has even degree.
   b). Determine whether the graphs given below are isomorphic
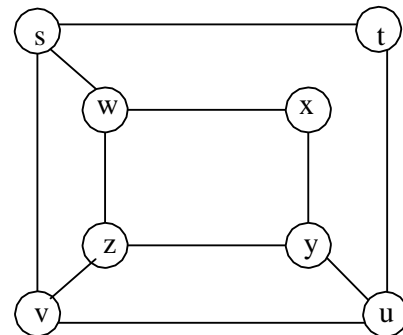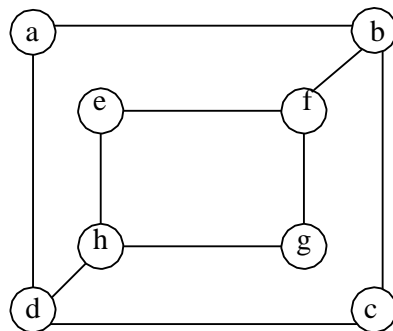
6. a). Prove that there are atmost m^h leaves in an m-ary tree of height h

  b). Describe the Prims algorithm for finding the minimum spanning tree of a graph.

7. a). Use the Quine-McCluskey method to simplify the sum-of-products expansion $wxy\overline{z} + w\overline{x}yz + w\overline{x}\ \overline{y} + \overline{w}xyz + \overline{w}\ \overline{x}yz + \overline{w}\overline{x}yz + \overline{w}\overline{x}\overline{y}z$.

  b). Find a phrase-structure grammar to generate the set $0^m 1^n$ where m, n $\geq$ 0

8. a). Show that, if the language L is recognised by a non deterministic finite-state automation M_0 then L is also recognized by a deterinistic finite-state automation M_1.

  b). Determine the language recognized by the finite-state automata M given by the following state diagram

MSCS 1.2   **Computer Organization**
.   Model Paper
First Question is Compulsory
Answer any four from the remaining and All Questions carry equal marks
Answer all parts of any Question at one place.

Time: 3 Hrs.   Max. Marks: 70

1. a   What is a decoder? Compare a decoder and a demultiplexer
   b.   Define the terms machine cycle, instruction cycle, and microprogram
   c.   What are the various schemes used for data transfer between processor and Input/Output devices?
   d.   What does DMA stand for? Assume that a processor receives an interrupt request and a DMA request at the same time. Which request does the processor process first? Why?
   e.   List the advantages of memory mapped I/O over I/O mapped I/O
   f.   What is a Cache memory? Give its applications
   g.   What are serial communication parameters?

2.   a. A two level NOR-NOR realization of some expression is shown in fig. Determine the Boolean expression and express it in SOP from. Construct The truth table of the following circuit and realize using NAND gates

     $F(x_1, x_2, x_3)$
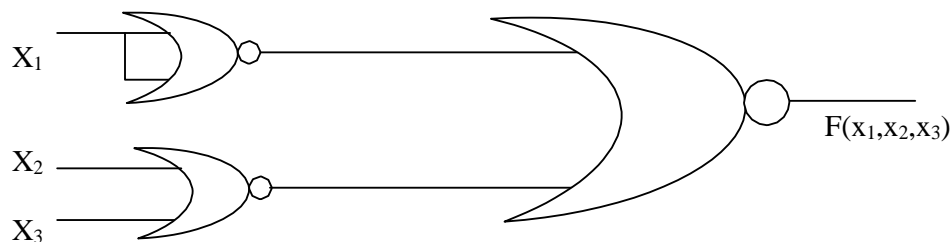
   b.   Construct a 4x 1 multiplexer using logic gates. Obtain 8 X 1 multiplexer with a dual   4 line to 1 line multiplexer having separate enable inputs but Common select lines.

3 a.   Explain with examples Fixed-point representation
   b.   Explain Memory reference instructions of hypothetical BASIC computer you have studied.

4 a   Discuss various addressing modes in a computer with the help of examples
   b   Show how you can evaluate   X=A+(B*C)/(D-E*F) Using a zero – address machine.

5 a   Explain about control memory and address sequencing
   b   Distinguish between micro-programming and hard wired control

6 a   Discuss clearly the general register organization of a typical CPU
   b   Explain in detail the Reduced Instruction Set Computer Architecture.

7 a   Discuss the different methods of data transfer between the CPU and I/O Devices.
   b   What is an interrupt? How is it generated? How are interrupts serviced by CPU?

8 a   Explain the need for memory hierarchy. Explain associative memory concepts in detail.
   b   Distinguish between virtual memory and main memory. Write the merits of virtual memory.

MSCS 1.3   **Data Structures And Algorithms**
.   Model Paper
                            First Question is Compulsory
              Answer any four from the remaining and All Questions carry equal marks
   Answer all parts of any Question at one place.
Time: 3 Hrs.   Max. Marks: 70

1 a   Constructors of c++
  b   Virtual Function
  c   Big – OH time complexity estimate
  d   Heap Property.
  e   Cluster formation in Hash tables
  f   What is a spanning tree?
  g.   What is adjacency matrix?

2   Define the ADT Queue and write c++ routines to implement the ADT queue.

3 a   Why are C++ templates required to implement generalized stacks.
  b   Write a C++ routine to reverse   the order element in a simply linked list by reorienting.
       The links

4.   Write a C++ routine for binary search algorithm and estimate its time complex city in the
       best, worst and average cases.

5 a   Trace the above C++ routine to arrange the following integers in ascending order using
       Quick sort procedure. 39,48,62,18,23,34,58.
  b   Write the C++ routine for Quick sort algorithm

6 a   What are AVL Trees? Arrange them above list of integers in an AVL Trees

  b
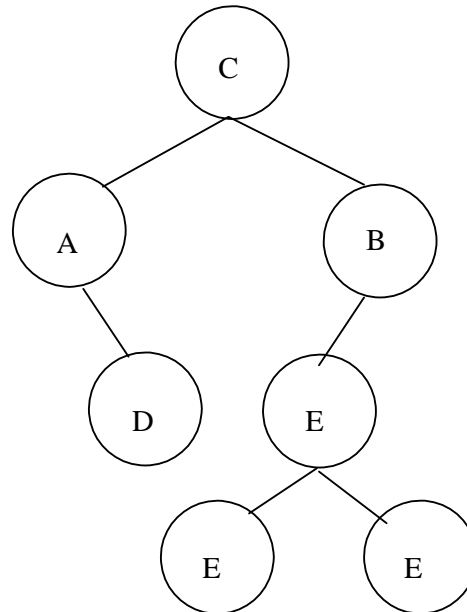
  c   Write the in order, preorder, and post order sequence of nodes of the above
       binary tree

7 a   Write the C++ routine for finding them minimum spanning tree for the given graph
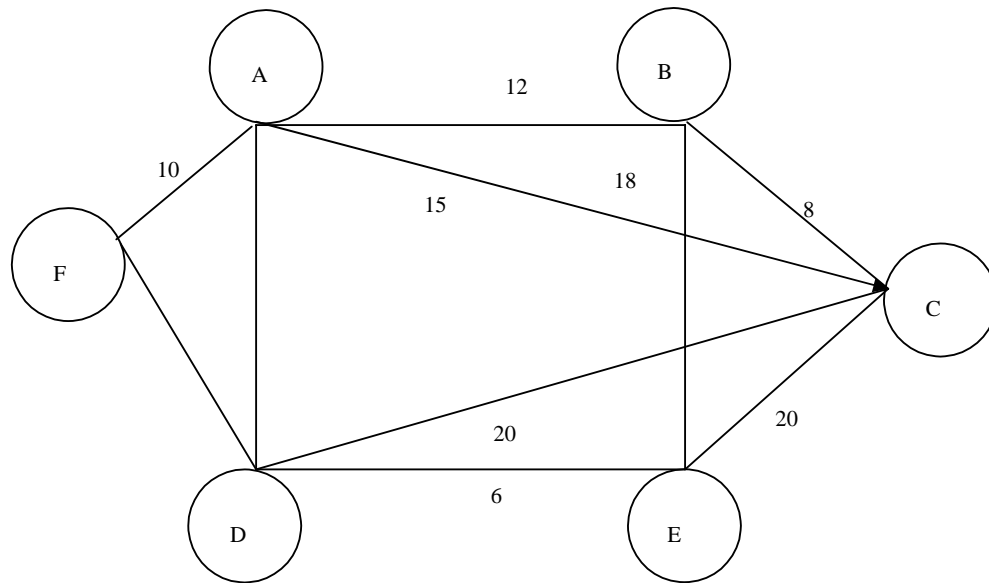
b   Represent the given graph write.
   i   Adjacency matrix Representation
   ii   Adjacency list Representation
   iii   Multi- list representation

8 a   Discus topological stating methodology and its application.
   b   Write a C++ returns for insertion and deletion of an element into a has a
   table with open addressing

MSCS 1.4   **Systems Programming**

.   Model Paper

First Question is Compulsory

Answer any four from the remaining and All Questions carry equal marks

Answer all parts of any Question at one place.

Time: 3 Hrs.   Max. Marks: 70

1. a   Differentiate in Between Open Sub Routine and closed sub routine.
   b   Define Grammar
   c   Differentiate In Between EQU and DC PSEUDO OPCODES.
   d   Define Macro Instruction.
   e   Differentiate In Between Pass and phase
   f.   What is a Cross Assembler?
   g.   Distinguish between system software and application software

2. a.   Explain the role of base register.
   b   Give Grammar for the following language   L=[a* b*]
   c   Differentiate In Between USING and DROP PSEUPO op codes.

3. a   Give the Design of single pass assembler.
   b   Can we write an ALP without using USING OP CODE? How? What are the limitations.
   c   What Will Happen If we write :- DS 0D.

4. a   Will the following divide 10 BY 2. Justify

            L 3,= f ' 10'
            D 2,=f ' 2'
            ST 3, 1000.

   b   Which instruction will be executed After the BE SAME. Why ?   justify your answer.
        CLI   =F1 31 3   (3)
        BE   SAME
        LR   3,5
        SAME AR 5,5
   c   Give the Design part of Assembler corresponding to LTORG pseudo op code
   d   Give the Design part of Assembler corresponding to Extended MNEUMONICS

5. a.   Give the Design of single pass macro processor.
   b.   Explain macro of type macros in macro

6. a   Give the Design of DLL .
   b   Explain BSS loader.

7.a   Explain parser in Detail
   b   Explain Lexical analyzer In brief
   c   Differentiate In Between syntax analysis and semantic Interpretation
   d   Mention Permanent tables and created tables of compiler.
   e   Differentiate productions & reductions .

8.   Explain in Brief About the following.
   a   Program generators.
   b   Interpreters.
   c   Over lay.

MSCS 1.5   **Data communications**
.   Model Paper
First Question is Compulsory
Answer any four from the remaining and All Questions carry equal marks
Answer all parts of any Question at one place.
Time: 3 Hrs.   Max. Marks: 70

1a   Write the Role of equalizer
 b   Discuss the types of TDM and draw schematic diagram for the different
      types of TDM
 c   Sketch TCP/IP suite and mention the protocols
 d   Explain cyclic redundancy check
 e   Explain poll select mechanism
 f.   What is bit stuffing?
 g.   Distinguish between Bit Rate and baud Rate

2a   Describe in brief protocol layer summary in ISO reference model
 b   Discuss Evolution of standards in data communications.

3a   Describe ASK, FSK and PSK
 b   A 1000 – bit block of data is to be transmitted between two DTES.
      Describe the ratio of propagation delay to the transmission delay for
      i) 100 m of twisted pair wire and a transmission rate of 10Kbps
      ii)10 Km of coaxial cable and a transmission rate of 1Mbps

4a   What do you understand by data compression and describe at least two kinds of data
      compressions commonly used?
 b   A series of 8 – bit message blocks (frames) is to be transmitted across a data link using
      CRC for error detection. A generator polynomial of 1001 is to be used. I11ustrate using
      CRC for the message 11101110

5a   Explain the role of connection management with respect to a protocol
 b   A series of 1000- bit frames is to be transmitted using a continuous RQ protocol.
      Determine the link efficiency for the following type of data link if the velocity of
      propagation is 2×10^8 ms^{-1} and bit error rates of the links are all negligibly low.
       A 50,000 Km satellite link of 2 mbps and a send window k=127.

6a   With the aid of frame sequence diagram and assuming go-back-N error
      control Scheme describe how the following are overcome
      i)   A corrupted ACK- frame
      ii)   A corrupted NAK – frame
      b)   Describe Idle RQ specification

7a   Discuss HDLC frame formats
 b   Describe character – oriented protocols

8   Write Short Notes on the following
      a Parity Check   b ATM Switching
      c Bit synchronization and character synchronization.

MSc. (Computer Science)

1st Year 2nd Semester
With Effect From 2007-08 admitted batch

Model Question papers

Chairman
Board of Studies

(2007-08)

Dept of Computer Science and Systems Engineering
College of Engineering
Andhra University
Visakhapatnam

MSCS 2.1   COMPUTER NETWORKS
.   Model Paper
                              First Question is Compulsory
              Answer any four from the remaining, All Questions carry equal marks

                        Answer all parts of any Question at one place.

Time: 3 Hrs.   Max. Marks: 70

1. **Write short notes on the following ?**
    a) **Token ring**
    b) **Address structure in IP**
    c) **Multicast support**
    d) **Token concept**
2. a) **Describe the major components and mode of operation of CSMA/CD bus network.**
    b) **Describe the functions of LLC sublayer?**
3. a) **Describe the advantages and disadvantages of a bridge?**
    b) **Write a short note on transparent bridge?**
4. a) **Describe the frame relay service in ISDN?**
    b) **What are the different protocol functions and briefly write about the address resolution?**
5. a) **Write a brief note on datagram structure in Ipv6?**
    b) **Write the differences between UDP and TCP?**
6. a) **Discuss the RSA and summarize with an example how RSA works?**
    b) **Describe the services provided by the Sessions layer and discuss.**
7. a) **Describe DES and briefly write about the implementation of DES.**
    b) **Write about ISO application protocols.**
8. a) **Discuss SMTP**
    b) **Describe the importance of DNS in the Internet?**

MSCS 2.2   COMPUTER GRAPHICS
.   Model Paper
                        First Question is Compulsory
        Answer any four from the remaining, All Questions carry equal marks

                    Answer all parts of any Question at one place.
Time: 3 Hrs.   Max. Marks: 70

1. a) **Simple DOA**
    b) **Describe about mouse and Image scanners**
    c) **Given a line function y=x, first scale it by 10 units along x-axis 20 units along   y-axis and rotate through origin by 45^0 in clockwise direction.**
    d) **Describe about Bezier surface.**
    e) **Explain about CRT.**
2. a) **Write a circle generation algorithm.**
    b) **Write about midpoint subdivision of circle generation algorithm.**
3.   **Explain briefly about I/O devices with suitable examples.**
 4. a) **Explain about 2-dimensional transformation and concatenation.**
    b)   **What is a matrix representation? Given an example for 2-dimensional transformation.**
5. a) **What is the difference between windowing and viewing.**
    b) **Explain window to view port co-ordinate transformation with example.**
6. a) **What are the rules designed for implementing a graphics package.**
    b) **Explain the characteristics for graphics package.**
7. a) **What is a projection and explain about polygon inside text.**
    b) **Explain rotation, scaling and shearing with examples.**
8. a) **Explain viewing transformation for 3rd transformations.**
    b) **Discuss about composite transformations.**

MSCS 2.3   OPERATION SYSTEMS
.   Model Paper
                        First Question is Compulsory
                     Answer any four from the remaining
                   Answer all parts of any Question at one place.
Time: 3 Hrs.   Max. Marks: 70

  1. a)   What is the difference between process and program. 7x2
     b)   What is multiprocessing?
     c)   What is a thread ?
     d) What for are resource allocating graphs used ?
     e) What is a semaphore ?
     f) What is a directory ?
     g) What is a process precedence graph ?

  2. a) Briefly discuss about operations system functions.   7
      b) Compare batch Vs. Multiprogramming operating systems.   7
  3.   Discuss several process scheduling algorithms.   14
  4.   Discuss virtual storage implementation using paging and
           segmentation.   14
  5. a) Briefly discuss about the UNIX file system.   10
      b) What is a capability list ?   4
  6. a) Discuss how Ada supports concurrent programming.   10
      b) What is a critical section ?   4
  7. a) Discuss about the design issues of inter process communication. 14
  8.   Explain the following:
      a) Deadlock prevention vs. avoid   7
      b) File organization.   7

MSCS 2.4   ARTIFICIAL INTELLIGENCE
.   Model Paper
                First Question is Compulsory
              Answer any four from the remaining
            Answer all parts of any Question at one place.
Time: 3 Hrs.   Max. Marks: 70

1.   Answer the following.   (7 x 2)
    a) State the relationship between the terms 'Intelligence' and 'knowledge'.
    b) State physical symbol system hypothesis.
    c) What is a heuristic function ?
    d) List out the basic components of a production system.
    e) Define a clause.
    f) Define the terms 'fact' and 'rule'.
    g) What is a certainty factor ?

2.   Explain state space approach in solving any AI problem. Discuss this for water jug
        problem.   14
3. a) Discuss the steps needed to convert a wff in predicate logic into clause form. 10
    b) Convert the following sentence into wff in predicate login and convert it into
        clause form. Anything any one eats and isn't killed by is food.   4
4. a) With suitable examples the advantages of script based representation over
        semantic nets.   7
    b) With a suitable example explain how TMS works.   7
5.   What is problem reduction? Explain AO* algorithm to tackle And-or graphs.14
6. a) With examples explain how unification algorithm works.   10
    b) Briefly explain RFTE matching algorithm.   4
7.   Discuss the following:
    a) AI programming vs. conventional programming.   4
    b) Hill climbing.   6
    c) Fuzzy Logic.   4
8. a) With a suitable example, explain recursion and iteration in LIST.   7
    b) Explain the operation of 'cut' and 'fail' predicates in PROLOG.   7

MSCS 2.5   OBJECT ORIENTED PROGRAMMING
.   Model Paper
                            First Question is Compulsory
              Answer any four from the remaining, All Questions carry equal marks

                        Answer all parts of any Question at one place.
Time: 3 Hrs.   Max. Marks: 70

1. a) Justify the statement that 'Object oriented paradigm is developed on the
        heals of earlier programming abstracts".
    b) What is an abstract base class? Explain with example.
    c) How is polymorphism achieved at run time.
    d) What is an interface? Explain how this concept can be used to achieve the power of
        pointers in Java.

2. a) Discuss how object oriented system development is different from traditional
        procedure oriented software development .
    b) describe how date abstraction is achieved in c++.
3. a) What are the various public member function of a
        class ? Give examples.
    b) Explain with example about the constructor overloading in c++.
    c) What are the steps involved in using a file in a C++ program ?
4. a) What are the different forms of inheritance in c++ ?
         Given an example each.
    b) Distinguish between private, protected & public access of classes.
    c) Describe how an object of a class that contains the objects of other
       classes be created.
5. a) When do we make a virtual function 'pure'? What are the
         implications of making a function pure virtual function?
    b) Define a class string and a template function sort.
         Write a program to read a set of strings and sort
         Them using template sort and print the sorted strings.
6. a) Describe a package and its relationship with classes.
    b) What are the steps to convert an application program into an
         applet program.
    c) Explain the exceptional handling mechanism in Java.
7. a) Explain briefly how to create, display and stretch
        images in Java
    b) Explain with examples how synchronization among various
       threads is achieved in Java.
8.   Write short notes on the following:
    a) Operator overloading in C++
    b) Multithreading in Java
    c) Templates in C++

M.Sc COMPUTER SCIENCE
1Year 3rd SEMESTER

With Effect from 2007 – 08 Admitted Batch

Model Question papers


```
Chairman
Board of Studies
```


Dept of Computer Science and Systems Engineering
College of Engineering
Andhra University
Visakhapatnam

MODEL PAPER
M.SC (CS) DEGREE EXAMINATION
Second Year – First Semester
OBJECT ORIENTED SOFTWARE ENGINEERING

Time : 3 Hours   **Max Marks: 70**
First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Write all bits of the first question at one place

1. a) For a school and its teacher association , indicate whether it should be an ordinary association, a standard aggregation or a composition
    b) Explain about an error, fault and failure
    c) What is project management?
    d) Write two disadvantages of the water fall model
    e) Write two advantages of PERT chart

2. what are the five of the most important attributes of software quality? Explain them
3. Describe as many sources of information as you can think of, that should be considered in order to perform a domain analysis for the following
    The house hold alarm system
4. create three classes linked by associations to represent a student taking courses in a school. Specify appropriate multiplicity as well as labels for the association. If there is more than one reasonable alternative, explain the advantages and disadvantages of each
5. For a library system, draw a use case diagrams that shows which actor perform which use cases.
6. Draw sequence diagram and a corresponding collaboration diagram for student registration system.
7. What is wrong with the following designs from the perspective of cohesion and what could be done to improve them?
        There are two subsystems in a university registration system that do the following:
        Subsystem A displays lists of courses to a student, accepts requests from the student to register in courses, ensures that the student has no schedule conflicts and is eligible to register in the courses, stores the data in the database and periodically backs up the database. System B allows faculty members to input student grades and allow administrators to assign courses to faculty members, add new courses, and change the student registration. It also prints the bills that are sent to students

8. Create a table of equivalency classes for the following single input problem. Some these might require some careful thought and/or some research. Assume that put an input in a separate equivalence class if there is even a slight possible that some reasonable algorithm might treat the input in a special way
        A telephone number to be used by an automatic dialer

MODEL PAPER
M.SC (CS) DEGREE EXAMINATION
Second Year – First Semester
RELATIONAL DATA BASE MANAGEMENT

Time : 3 Hours   **Max Marks: 70**

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Write all bits of the first question at one place

1 a) Relational algebra operators
  b) Surrogate keys
  c) Data Dictionary
  d) Overflow in hashing
  e) QBE

2. What is an ER Model? What are the different types of relationships? Give an ER
   diagram for a database showing University, Affiliated Colleges, Courses, and Students.

3 a) What are the different types of File Organizations?
  b) Discuss how to insert, delete records from a B-Tree.

4.What is SQL? Discuss the difference between nested and correlated queries. Discuss
  with the following popular relations, how to perform the SQL opearations.

  Emp (empno, ename, deptno, desg, sal, comm, mgrcode, hiredate)
  Dept (deptno, dname, loc)
  Salgrade (lowsal,hisal, grade)
  a) List for each dapartment the dname and the average salary
  b) List the desg (designations) which are exclusive to dept=20
  c) List the ename, grade of employees working for dept=10
  d) Update salary of all employees by 20% if the existing salary is in the limits 2500 to 3500
  e) Dalete all employees whose name starts with letter "M"

5.What is Relational Calculus? Discuss tuple related and domain related calculus with
  suitable examples.

6.What is Normalization? Discuss the importance of normal forms with suitable
  examples.

7.a) What is integrity? Discuss the different types of integrity constraints.
  b) Discuss the different types of access control mechanisms.

8.a) What are the three consistency problems in transaction management?
  b) Discuss how locking can be used to tackle the concurrency problems.

MODEL PAPER
M.SC (CS) DEGREE EXAMINATION
Second Year – First Semester
Network Security

Time : 3 Hour   **Max Marks: 70**

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Write all bits of the first question at one place

1) Write briefly about the following
   a) Types of attacks
   b) Issues in Key distribution
   c) Digital signature
   d) Viruses
   e) Authentication

2. a) Explain the DES Algorithm
   b) Describe the cipher block modes operation

3. a) What are the various approaches to message authentication.
   b) Describe the4 SHA algorithm for message authentication

4. Describe Electronic mail security using PGP

5. a) What are web security requirements? Explain
   b) Describe the SSL architecture and Record protocol.

6. What is SNMP? Explain how it is useful in Network management?

7. What is intrusion detection? Describe two approaches for intrusion detection

8. Describe Firewall characteristics, Types and configurations

MODEL PAPER
M.SC (CS) DEGREE EXAMINATION, 2002
Second Year – First Semester
Theory of Computation

**Time : 3 Hours**   **Max Marks: 70**

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Write all bits of the first question at one place

1 a) Prove the Equivalence of DFA and NFA.
  b) Construct the DFA Equivalent to the NFA

State \ input	0	1	2
q_0	$\{q_1, q_4\}$	$\{q_4\}$	$\{q_2, q_3\}$
q_1	-	$\{q_4\}$	-
q_2	-	-	$\{q_2, q_3\}$
(q_3)	-	$\{q_4\}$	-
q_4	-	-	-

c) Construct the regular expression for the DFA denoted by,
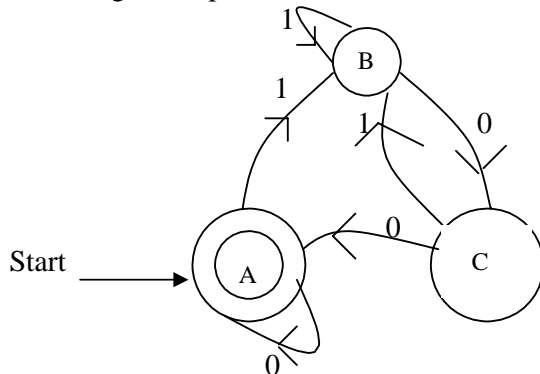
2 a) Discuss the equivalence of Mealy & Moore Machines?   4
  b) Construct the minimized DFA Equivalent to   6

State \ input	0	1
q_0	q_0	q_3
q_1	q_2	q_5
q_2	q_3	q_4
q_3	q_0	q_5
q_4	q_0	q_6
q_5	q_1	q_4
(q_6)	q_1	q_3

c) Construct NFA equivalent to 2DFA.

$(\{q_0, \ldots.q_4\}, \{0, 1\}, \delta, q_0, \{q_2\})$ where δ is given by   5

State \ input	0	1
q_0	(q_0, R)	(q_1, R)
q_1	(q_1, R)	(q_2, R)

q_2	(q_2 , R)	(q_3 , L)
q_3	(q_4 , L)	(q_3 , L)
q_4	(q_0 , R)	(q_4 , L)

3 a) State & Prove Pumping Lemma for Regular sets

  b) Show that L is not regular where

$$L = \{ 0i^2 / i \text{ is an integer, } i >= 1 \}.$$

  c) Show that the class of regular sets are closed under quotient with arbitrary sets.

4 a) Given a grammar G whose production are.

$$S \to AB , A \to a , B \to C \mid b$$
$$C \to D , D \to E , E \to a.$$

  Find an equivalent grammar, which is reduced and also has no unit productions.

  b) Show that the grammar, whose productions are:

$$S \to a \mid ab \, sb \mid aAb$$
$$A \to bS \mid aAAB \text{ is ambiguous}$$

  c) Reduce the following grammar to greibaach normal form.

$$S \to Ao$$
$$A \to oB$$
$$B \to Ao$$
$$B \to \mid \varepsilon$$

5 a) Write CYK algorithm and apply the grammar. G, Whose Productions are

$$S \to AB \mid BC$$
$$A \to BA \mid a$$
$$B \to CC \mid b$$
$$C \to AB \mid a$$

     to find b a a b a ε C(G) or not.

  b) Construct a PDA equivalent to the following context free grammar.

$$S \to OS \mid IS \mid O \text{ text } O \mid O^4 \text{ is in } n(A).$$

  c) If L is L (M_2) for some PDA M_2 then show that L is $N(M_1)$ for some PDA M_1.

6 a) Let f(0)=1, f(1)=2, f(2)=3 and $f(x+3)=f(x)+f(x+1)^2+(f(x+2))^3$. Then show that f is
     primitive recursive.

  b) State and prove the Rice theorem.   c)
Explain the Chomesky hierarchy of languages with examples.

7 a) Design a Turing Machine to recognize the language $(0^n 1^n 2^n / n >= 1)\}$

  b) State and prove the Halting problem

  c) If a language L is accepted by a multi tape Turing Machine, then show that L is accepted by a
single tape Turing machine.

8 Write short notes on the following:

  a) PCP
  b) Chomeskian Normal form.
  c) Universal Turing Machines
  d) Computable and non computable functions

MODEL PAPER
M.SC (CS) DEGREE EXAMINATION
Second Year – First Semester
Bioinfomatics (Elective)

Time : 3 Hours   **Max Marks: 70**

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Write all bits of the first question at one place

1. Explain the following:
    a) Folding Problem
    b) Motifs
    c) UniGene
    d) Positional Cloning
    e) Identity and Similarity
    f) Consensus
    g) Hidden Markov Models
    h) Local Alignment Vs Global Alignment
    i) Phylogenetic Tree
    j) Folding Problem

2. a) What is bioinformatics? Explain the importance of bioinformatics?
   b) What are the application areas of different analysis methods?

3. a) Explain the structure of SWISS-PROT entries.
   b) Why create secondary databases?

4. a) Explain GenBank.
   b) What is the importance of specialized genomic resources?

5. What is GenBank? Explain the structure of GenBank entries

6. a) Explain Central Dogma of Molecular biology with neat diagram.
   b) Describe features of DNA sequence analysis

7. a) Write about BLAST (Basic Local Alignment Search Tool)
   b) Explain the Needleman and Wunsch algorithm for global alignment

8. a) Define Multiple sequence alignment? What is the goal of Multiple
      sequence alignment?
   b) Explain simultaneous methods and progressive methods for multiple
      alignments?

9. a) Why secondary database searches are needed?
   b) Explain structure of secondary database.

MODEL PAPER
M.SC (CS) DEGREE EXAMINATION
Second Year – First Semester
EMBEDDED SYSTEMS (Elective)

Time : 3 Hours   **Max Marks: 70**

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Write all bits of the first question at one place

1.   a) Explain Atomic Operations, give any one atomic instruction for any
          processor known to you?
          b) Distinguish between Microprocessors and Microcontrollers
          c) Explain any two schemes for inter task communication.
          d) What is watchdog timer in a single board computer? Explain.
          e) What are the two rules that an interrupt routine must adhere to in an RTOS
          environment.

2.   Explain with neat functional block diagram the various architectural features of
          8051 Microcontroller

3.   a) Give the programming model of 8051. Write 8051 Assembly Language
          program to transfer data in internal RAM locations 10H to 20H to internal
          RAM locations 30H to 40H
          b) Give the flow chart and 8051 Assembly Language Program to count the number of bytes
          in external RAM locations 100h to 200h that are greater than the random unsigned number in
          R3 and less than the random unsigned number in R4. Use registers R6 (LSB) and R7
          (MSB) to hold the count.

4.   a) Explain (i) Round Robin architecture, ii) Preemptive scheduling?

          b) What is reentrancy? Give the necessary conditions to make a function reentrant.

5.   a) Bring out the subtle differences between real time operating systems and   typical
          (non real time) operating system?
          b) Explain the architecture of function queue scheduling, write a C program for
          implementing the same.

6   a) Explain the characteristics of real-time operating system architecture for
          embedded applications.
          b) Suggest a suitable architecture for road traffic lights control at a four-road
          intersection Give hardware and software requirements.

7.   What is priority inversion? How this can be solved? Take up a problem of elevator
          for four floors, identify the number of tasks required, their priorities and their
          functions in the process of designing a an application software in Real Time.

8.   Write short notes on the following:
          a)   Interrupt Latency
          b)   Applications of Embedded Systems
          c)   Hard Real-Time and Soft Real-Time Systems
                              MODEL PAPER

M.SC (CS) DEGREE EXAMINATION
Second Year – First Semester
IMAGE PROCESSING (Elective)

Time : 3 Hours   **Max Marks: 70**

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Write all bits of the first question at one place

1. a) Define connectivity.
   b) Define quantization.
   c) Define "noise" of an image
   d) Define Walsh transform.
   e) Explain compression due to quantization.

2. Give an Algorithm for FFT.
3. a) How do you Acquire an image? Explain in detail.
   b) Define and explain image sliding and image stretching.
4. a) Define and explain low pass filters in brief
   b) Define and edge. Explain various edge enhancement filters.
5. a) Define prewitt filter.
   b) Explain in detail "Homomorphie filter".
6. a) Explain compression at the time of Image Transmission.
   b) Explain about standardization in image compression.
7. a) Explain split and merge technique for segmentation.
   a. Define and explain thresh holding.
   b. Explain segmentation by PIXEL based methods.
8. a) Define Erosion and Dilation.
   b) Explain how the morphological operations may be extended to gray scale images.
   c) Explain "Skeletanization" in detail.

MODEL PAPER
M.SC (CS) DEGREE EXAMINATION
Second Year – First Semester
DATA WAREHOUSING (Elective)

Time : 3 Hours   **Max Marks: 70**

First Question is Compulsory
Answer any four from the remaining questions
All Questions carry equal marks
Write all bits of the first question at one place

1. Briefly discuss the following topics:
    a) Characteristics of CDW `System of Records'.
    b) Automatic cluster Detection.
    c) Statistical analysis versus Data mining.
    d) Types of metadata stored in Data warehousing
    e) Data granularity model.

2. a) What is a Data Warehouse and explain how is it different from a Data Mart.
    b) Explain how the usage of Data Warehouse enhance Business Intelligence

3. a) Write the three layers of software architecture of a Data Warehouse environment.
    b)Draw the block diagram of warehouse management subsystem and explain.

4. a) Discuss the objectives and basic techniques available for requirements modeling.
b)Discuss different temporal data modeling styles for the development of CDW.

5. a) Discuss the essential elements of multi-dimensional data model.
    b)What are slow – varying dimensions and how are they modeled.

6. a)Write different techniques for Multi – dimensional data analysis.
    b)Write the functional as well as technical characteristics of a relational – OLAP technology.

7. a)Discuss the functional component of the Departmental Data Warehouse populating subsystems.
    b)Discuss different types of transformations done on source data in the process of populating a CDW.

8. Write short answers on
    a) Data Partitioning.
    b) Snow flake model for Multi – Dimensional data modeling
    c) Market Basket Analysis