[5234]-11

M.C.A. (Under Science Faculty) (Semester - I)
COMPUTER SCIENCE
CS - 101 : C Programming
(2008 Pattern)

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

Instructions to the candidates:

    1)   *Figures to the right indicate full marks.*

    2)   *All questions carry equal marks.*

    3)   *All questions are compulsory.*

    4)   *Assume Suitable data if necessary.*

Q1) a)   Trace the output (Any two)   **[2 × 4 = 8]**

      i)   main()

```
{
    int i=();
    while(i<5)
    {
        if (i < 3)
        {
            Printf("%d",i+2);
        }
        else
        {
            i=5;
            printf("%d",i);
        }
        i++;
    }
}
```

ii)   # define square (x) x*x

Main()

{

    int s;

    s=square(2+3);

    printf("%d",s)

}

iii)   int i = 10;

main()

{

    int i = 5; j=0;

    while(j<=i)

    {

        printf("%d",++j);

        j++;

    }

}

b)   Find error and explain (Any two)   [2 × 4 = 8]

i)   Main()

{

    float opt;

    Printf("Enter choice");

    Scanf ("%f",opt);

    switch (opt)

        {

            default: exit (0);

            Case 3.0 : printf("You are in case three");

```
                    Case 2.0 : printf("You are in case two");
                    Case 1.5 : printf("You are in case 1.5");
                }
            }
    ii)   Struct stud
          {
                int rno;
                char name [10];
          };
          main ()
          {
                stud s;
                printf("Enter roll no and name of the student:");
                scanf("%d",s->rno);
                gets (s-name) ;
          }
    iii)  #def product(x,y) x*y;
          main ()
          {
                    int a=2, b=3,c;
                    c=product (a,b);
                    printf("%d",c);
          }
```

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

   a)   Write a note on storage classes.

   b)   Differentiate between for and do-while loop.

   c)   Give structure of c program and explain with example.

   d)   What are different methods to pass values to a function. Explain with example.

   e)   List all escape sequence characters and explain any four in detail.

Q3) Attempt any four of the following :   [4 × 4 = 16]

a)   Write a C program using function to check whether given number is armstrong number or not.

b)   Write a C program using recursive function to compute sum of digits of number.

c)   Write a C program to find transpose of matrix.

d)   Write a C program to check whether given string is palindrome or not

e)   Write a C program to find sum of all elements of array. Pass array to function. Use pointers to access elements of array into function.

Q4) Attempt any four of the following :   [4 × 4 = 16]

a)   Give syntax of the following functions and explain with example

    i.   strcmpi

    ii.   strlen

    iii.   strrev

    iv.   strstr

b)   Give syntax of the following functions and explain with example.

    i.   fopen

    ii.   fgetc

    iii.   feof

    iv.   fseek

c)   Write a note on dynamic memory allocation.

d)   List and explain any four built in library functions used for graphics in C.

e)   What is self-referential structure? Explain with example.

Q5) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Write a C program to read contents from one file and store it into another file by toggling the case of characters.

    b)   Write a C program to using structure to accept the details of employee such as empid, designation, dept, salary etc. and display those employees having salary above 10,000.

    c)   Write a C program using command line arguments to calculate addition numbers pass through command line.

    d)   Write a C program to allocate memory to n integers dynamically and calculate sum of all elements.

    e)   Write a C program to compute multiplication of two matrices.

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[5234]-12

M.C.A. (Science Faculty) Semester - I
CS - 102 : COMPUTER ARCHITECTURE
(2008 Pattern)

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

Instructions to the candidates:

1)   All questions are compulsory .

2)   Draw neat diagram wherever necessary.

3)   Figures to the right indicate full marks.

Q1) Attempt any four :   **[4 × 4 = 16]**

a)   Draw logic diagram of S.R. flip flop and explain it in detail.

b)   Explain following addressing modes of pentium microprocessor.

  i)   Register addressing mode

  ii)   Base

c)   Explain ISA bus.

d)   Explain with block diagram of I/O Interface.

e)   Explain RISC Pipelining.

Q2) Attempt any two of the following :   **[2 × 8 = 16]**

a)   Explain counters in detail.

b)   Compare real mode and protected mode.

c)   Explain Bus format and it's operation.

Q3) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   What is flip - flop? Draw logic diagram of J - K flip - flop and write its truth table.

    b)   Compare EISA and PCI bus.

    c)   Write any four components of microprocessor.

    d)   What is DMUX? Explain it with logic diagram.

    e)   Explain decimal to BCD encoder.

Q4) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Explain Instruction cycle and execute cycle in detail.

    b)   Explain vector processing.

    c)   Draw DMA block diagram and explain DMA function.

    d)   What do you mean by decoder and encoder.

    e)   Compare Asynchronous communication and synchronous communication.

Q5) Attempt any two of the following :   **[2 × 8 = 16]**

    a)   Draw neat block diagram of Intel Math Co-processor and explain its 'Numeric Execution unit'.

    b)   Explain shift register in detail.

    c)   Explain A to D converter in detail.

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[5234]-13

M.C.A. - I (Under Science Faculty) (Semester - I)
CS - 103 : MATHEMATICAL FOUNDATION
(2008 Pattern)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *All questions carry equal marks.*

   3)   *Figures to the right indicate full marks.*

   4)   *Use of non-programmable scientific calculator is allowed.*

Q1) Attempt any four of the following: **[16]**

   a)   Let X = {1,2,3}. Write down all eight subsets of X . If X consists of n elements, how many subsets of X are there?

   b)   For any three sets A, B and C, Prove that

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

   c)   Let $f : R_o \to R_o$ defined by $f(x) = \dfrac{1}{x}$; for all $x \in R_o$, where R_o be the set of all non-zero real numbers . Is f one-one and onto function. Justify your answer.

   d)   Let $\sim$ be a relation define on the set of integers Z by $x \sim y$ if and only if $5x + 6y$ is divisible by 11 for $x, y \in Z$. Show that $\sim$ is an equivalence relation.

   e)   Let the function $f : R \to R$ be defined by

$$f(x) = \begin{cases} x^2 - 3x, & if \ x \le 2 \\ x + 2, & if \ x \ge 2 \end{cases}$$

      Find i) $f(5)$ ii) $f(-2)$

P.T.O

Q2) Attempt any four of the following :   **[16]**

   a)   Let a,b,x,y be non - zero integers and Let xa + yb = 1. Then show that
        (a,b) = (x,y) = (a,y) = (x,b) = 1

   b)   Find gcd of 3997 and 2947.

   c)   For any integer x show that (a,b) = (a, b + ax).

   d)   Show that, there are precisely n distinct residue classes modulo n.

   e)   Which elements of Z_6 Satisfy $X^2 = X$?

Q3) Attempt any four of the following :   **[16]**

   a)   Show that the set of all 2×2 matrices of the type $\begin{bmatrix} a & a \\ a & a \end{bmatrix}$; $a \neq 0$,
        forms an abelian group under multiplication of matrices.

   b)   Find all subgroups of $\langle Z_{12}, +_{12} \rangle$.

   c)   Prove that every permutation is a product of it's cycles.

   d)   Find inverse of the following

        Matrix $A = \begin{bmatrix} 2 & 4 & 2 \\ -2 & 0 & 4 \\ 4 & 1 & -6 \end{bmatrix}$

   e)   Define following terms with proper example
        i)   Skew symmetric matrix
        ii)   Scalar Matrix

Q4) Attempt any four of the following :   **[16]**

   a)   By using truth table, show that statements $\sim (p \Leftrightarrow q)$ and $p \Leftrightarrow \sim q$ are
        logically equivalent.

   b)   Show that $p \Leftrightarrow (\sim p \vee \sim q)$ is a tautology.

c) Translate into symbolic form and test the validity of the argument.

If 5 is a prime, then 5 does not divide 15. 5 divides 15, therefore, 5 is not a prime.

d) Let n be an integer. Prove that if n^2 is odd then n is odd.

e) What is the truth value of the statement $(\forall x \in A)\,(x+3<10)$, where $A=\{1,2,3,4,5\}$

Q5) Attempt any two of the following :   **[16]**

a) State and prove Division Algorithm.

b) Solve the following system of linear equations.

$$x_1 + 4x_2 + 5x_3 + 6x_4 + 9x_5 = 0$$
$$3x_1 - 2x_2 + x_3 + 4x_4 - x_5 = 0$$
$$-x_1 - x_3 - 2x_4 + x_5 = 0$$
$$2x_1 + 3x_2 + 5x_3 + 7x_4 + 8x_5 = 0$$

c) Find gcd of 3587 and 1819 and express it in the form 3587 m + 1819 n.

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[5234]-14

M.C.A. (Under Science Faculty) (Semester - I)
MATHEMATICS
Graph Theory
(2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*
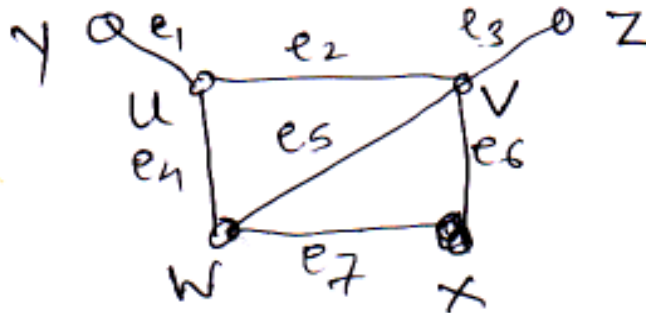
2) *figures to the right side indicate full marks.*

Q1) Attempt any four of the following :   **[16]**

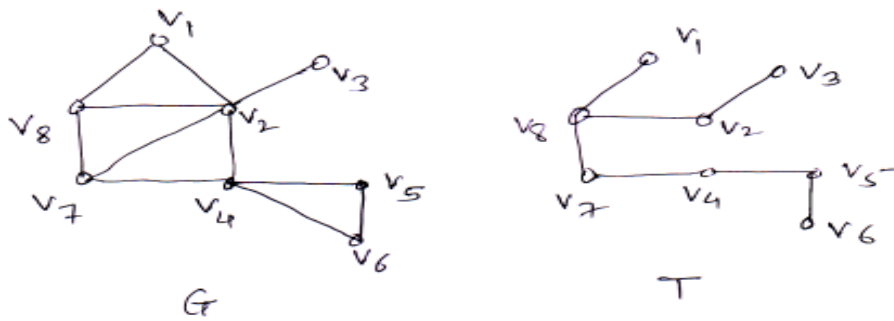a) Draw the graph G having following Incidence matrix and find its adjacency matrix.

$$\begin{bmatrix} 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

b) Show that, In a graph G the number of vertices of odd degree is even

c) If G is a graph as shown below, draw the graph after the fusion of u and v vertices

d) Find all the fundamental cycles in G with respect to its spanning tree T.

e) If G_1 and G_2 are two simple graphs then show that $G_1 \cong G_2$ if and only if $\overline{G} \cong \overline{G}_2$.

Q2) Attempt any four of the following : **[16]**

a) Solve the following recurrence relation $a_n - 3a_{n-1} - 4a_{n-2} = 4^n$

b) If G is a self complementary graph on 'n' vertices, then show that n is of the type 4k or 4k+1 for some integer k.

c) Draw Binary trees with 25 vertices of minimum and maximum heights.

d) If u is a vertex of odd degree in a graph G then prove that there must be a path in G from u to another vertex V of odd degree.

e) Compute eccentricities of all vertices of the following graph.
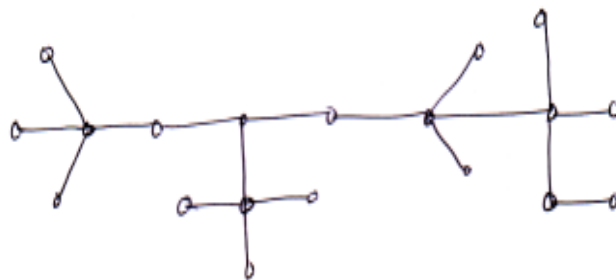
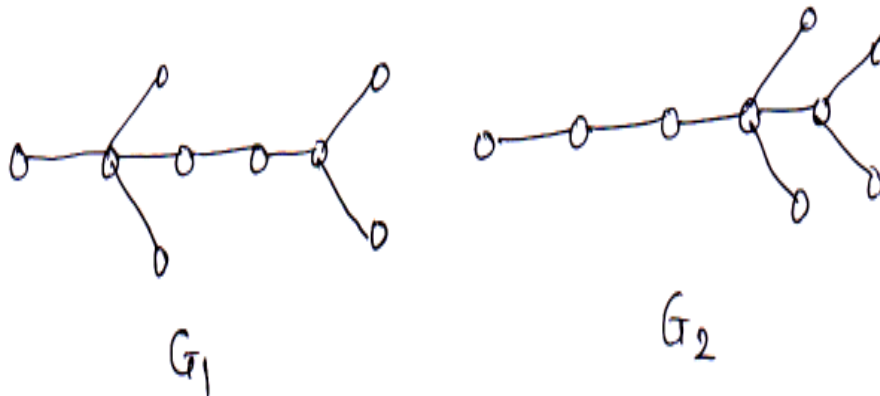Hence, find radius and diometer of the given graph.

Q3) Attempt any four of the following : [16]

a) Solve the recurrence relation :

$a_n = 2^n + 4a_{n-1} + 5a_{n-2}; n \geq 2 \ and \ a_0 = 1, \ a_1 = 2.$

b) Determine if the following graphs G_1 and G_2 are isomorphic

G_1 G_2

c) Let G be a simple on n vertices and $\bar{G}$ its complement. Prove that, for each vertex V in G, $d_G (V) + d_{\bar{G}} (V) = n -1$, Where d_G (v) denotes degree of V in G.

d) Write the definition of complete symmetric and complete asymmetric digraphs. Give their examples also.

e) Show that, the vertex connectivity of graph G cannot exceed the edge connectivity of G i.e. k (G) $\leq \lambda$ (G)
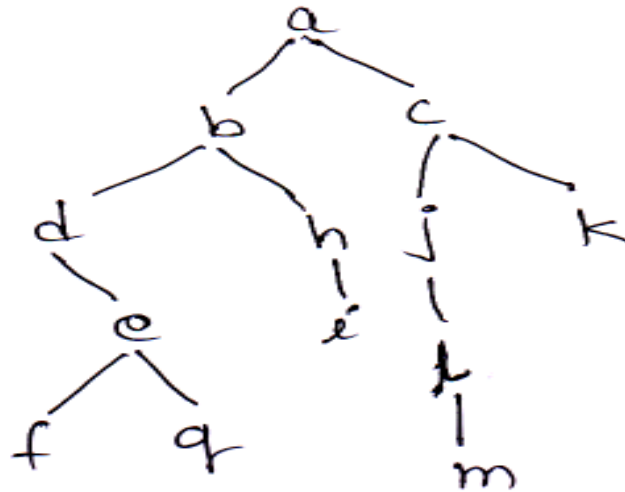
Q4) Attempt any four of the following : [16]

a) Draw the arborescence and express in polish notation. $\dfrac{(4a - 7b)^2}{(3d + c^3)}$

b) Define Binary tree and prove that the number of pendant vertices in a binary tree with n vertices is $\left(\dfrac{n+1}{2}\right)$.
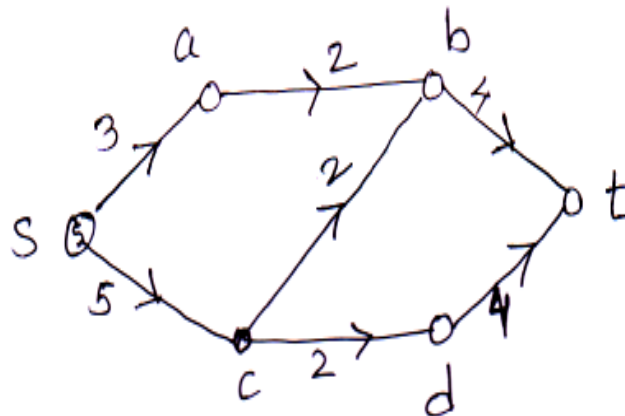
c) Obtain preorder and post order traversals for the following binary tree.

d) Define : i) Network and flow

ii) State maximum flow - Minimum cut theorem.

e) Explain chinese postman problem.

Q5) Attempt any two of the following : **[16]**
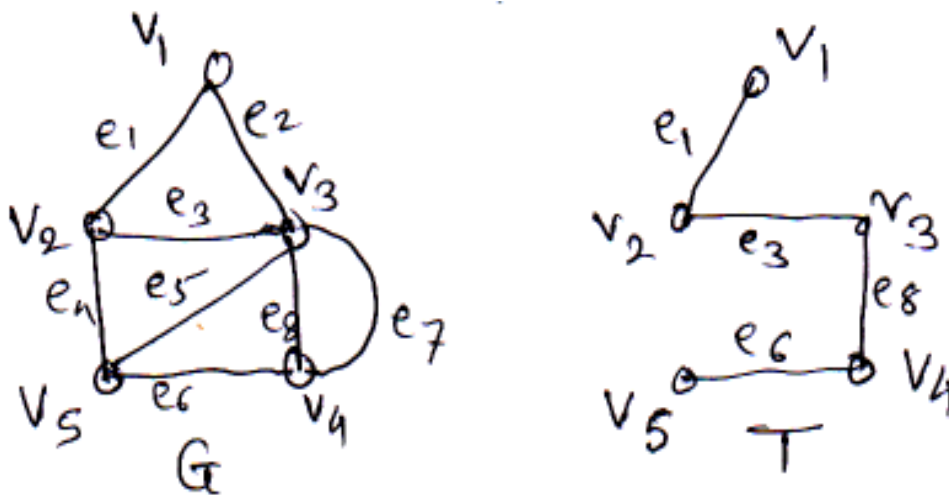
a) Determine the maximal flow in the given network, from source 'S' to sink 't'

b) Use dijkstra's algorithm on the following connected weighted graph to find the length of the shortest paths from vertex 'a' to each of the other vertices.
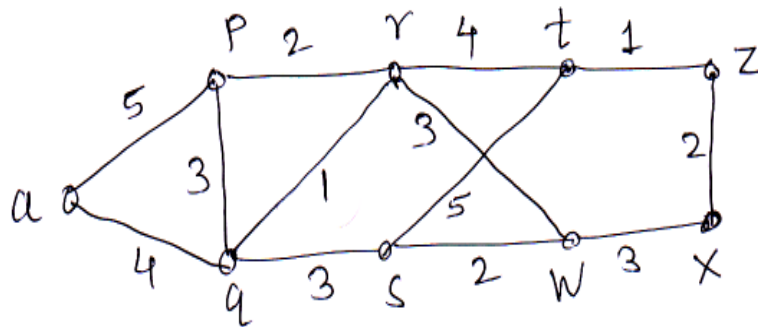
c) Consider the following graph G and It's spanning tree T. List all fundamental circuits. and cutsets of G with respect to T.

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[5234]-21

M.C.A. (Science Faculty) (Semester - II)

CS - 201 : Data and File Structures Using 'C'

(2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory .*
2) *Figures to the right indicate full marks.*
3) *All questions carry equal marks.*

Q1) Attempt any four of the following : **[4 × 4 = 16]**

a) What is ADT? Consider array A [2] [3], Show i) Row Major ii) Column major representation.

b) Explain sparse indexing in brief.

c) Create and display single linked list & show it graphically.

d) What do you mean by stack and queue? Also differentiate stack and queue.

e) What is circular linked list? Explain it with different operations.

Q2) Attempt any four of the following : **[4 × 4 = 16]**

a) Write algorithm to convert prefix expression to infix expression.

b) Discuss various applications of graph. List out two types of graphs.

c) Explain queue operations briefly.

d) Write a 'C' function to insert element into linked list at various positions.

e) What is rotation? Explain rotations different types.

Q3) Attempt any four of the following :   [4 × 4 = 16]

   a)   Convert following infix expression to postfix expression (A + B) * (C + D)

   b)   Define deque. Explain it with example.

   c)   Write short note on doubly linked list.

   d)   What is tree traversal? Explain briefly.

   e)   Sort following data using quick sort. Show all iterations.
            22, 10, 15, 1, 61, 11, 59, 16

Q4) Attempt any four of the following :   [4 × 4 = 16]

   a)   Write 'C' function to delete and insert element in linked list.

   b)   Write short note on hashing

   c)   Write algorithm to multiply two polynomials.

   d)   Construct BST for following elements. Show all iterations.
            10, 20, 15, 5, 1, 6, 13.

   e)   Write a 'C' function for bubble sort.

Q5) Attempt any four of the following :   [4 × 4 = 16]

   a)   What is B + tree structure? Give characteristics of B + tree.

   b)   Write the steps of BFS algorithm.

   c)   Sort the following numbers using merge sort.
        9, 5, 6, 10, 15, 17, 13, 2, 25, 3

   d)   Compare Breadth first search and Depth first search.

   e)   Write algorithm of binary search method for an array of integer.

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[5234]-22

M.C.A. (Science Faculty) (Semester - II)
CS - 202 : THEORETICAL COMPUTER SCIENCE
(2008 Pattern)

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

Instructions to the candidates:

  1) All questions are compulsory.

  2) Neat diagrams must be drawn wherever necessary.

  3) Figures to the right indicate full marks.

Q1) Attempt all of the following :   **[8 × 2 = 16]**

  a) What is set?

  b) Which laws apply on sets?

  c) What is kleene closure?

  d) Define term DFA?

  e) What is ambiguous grammar?

  f) What is equivalence relation with example?

  g) Explain finite and infinite sets?

  h) What is Melay machine?

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

  a) Construct DFA for a language containing strings starting with 1 and ending with 00 over alphabet {0,1}.

b) Consider following CFG

       $S \to 0A0$

       $A \to S1/1CC/D0A$

       $C \to 011/DD$

       $E \to 0C$

       $D \to 0DA$

       Eliminate useless symbols from grammar.

c) Prove that regular sets are closed under intersection.

d) Construct PDA for $L = \{0^m 1^n 2^p | m,n,p \geq 1, m = n + p\}$

e) Construct Moore machine equivalent to the Melay machine (given below)
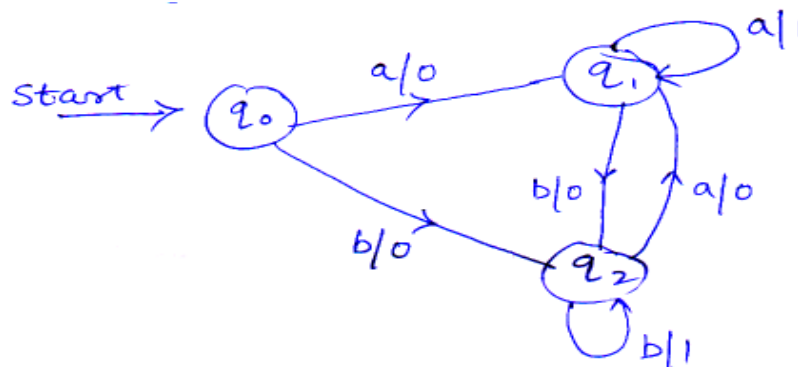
Q3) Attempt any four of the following :   **[4 × 4 = 16]**

  a) Construct CFG for language L

    $L = \{a^n b^m c^n \mid n \geq 1, m \geq 0\}$

  b) Construct DFA equivalent to following NFA.
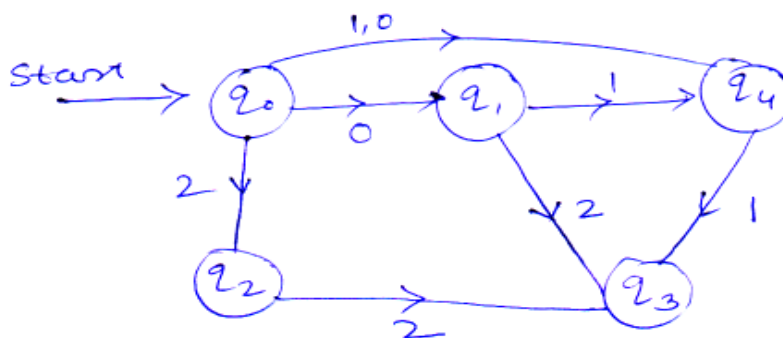
c) Construct PDA equivalent to following CFG

S → 0A1

A → 0A1/B

B → 1B/1

d) Construct T.M. for $L = 0^n 1^n$, where $n >= 1$

e) Construct grammar by eliminating.

C → Productions

S → BC/AB

A → aAa / b

B → bAa / E

C → E

Q4) Attempt any four of the following : [4 × 4 = 16]

a) Construct PDA for $L = \{0^m 1^n 2^p / m, n, p \geq 1, m = n + p\}$

b) Construct NFA to accept set of strings in $(0 + 1)^*$ such that 3rd symbol from right is 1

c) Show that $L = \{a^p, p$ is prime$\}$ (using pumping lemma)

d) Construct regular grammar for following DFA.
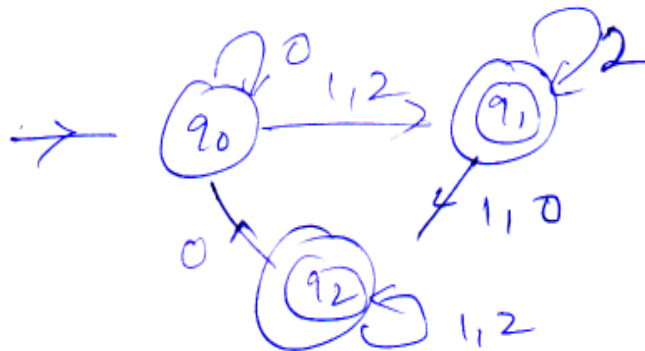
e)   Minimize the following DFA
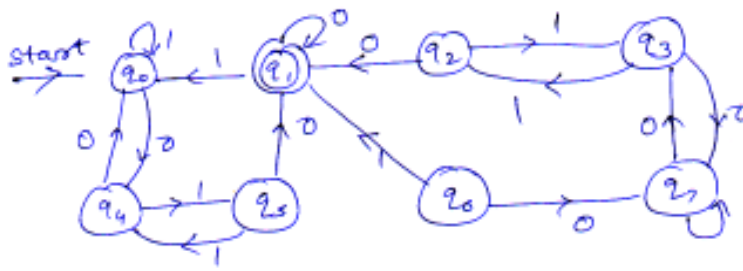
Q5) Attempt any four of the following :   **[4 × 4 = 16]**

a)   Construct T.M. $L = \{a^m b^n | m > n \text{ and } n > 0\}$

b)   Convert following grammar in to GNF.

$S \rightarrow AB$

$A \rightarrow SB/a$

$B \rightarrow AB /b$

c)   Construct DFA for $L = L_1 \cap L_2$ over alphabet $\{a,b\}$ where,

L_1 = All strings of even length

L_2 = All strings starting with b.

d)   Convert following grammar into CNF.

$S \rightarrow a \ Aab / Aba$

$A \rightarrow aS/bB$

$B \rightarrow ASb/a$

e)   Construct Melay machine for input from $(a + b)^*$ such that if input string ends with 'abb' then its outputs '*', if input string ends with 'aba' then its outputs '#' otherwise outputs '$' .

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[5234]-23

M.C.A. (Under Science Faculty) (Semester - II)
CS - 203 : OBJECT ORIENTED PROGRAMMING
(C++ Programming)
(2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*

2) *figures to the right indicate full marks.*

Q1) Attempt any four of the following: **[4 × 4 = 16]**

a) Differentiate between object oriented programming and procedure oriented programming.

b) What is friend function? Give merits & demerits of using a friend function.

c) Explain class template?

d) What are various access specifiers in c++? Explain them with example?

e) Explain syntax for read () and write () function for file handling.

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

a) What is inline function? Give syntax and example with explanation.

b) "A Function can return a reference in C++". Comment & explain with example :

c) Explain the following with syntax and example :

   i)   Try   ii)   Throw

   iii)   Catch

d)   What is scope resolution operator? Explain any two uses of it.

e)   What is hierarchical inheritance? Explain with example.

Q3) Attempt any two of the following :   **[2 × 8 = 16]**

a)   Design the classes using the following.

Account

↑

Saving Account
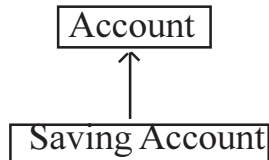
Write functions to accept and display records for n objects.

b)   Write a program in C++ to overload function to add two integers, two float and two arrays.

c)   Trace the output of following program & explain if.

```
# include <iostream.h>
# include <conio.h>
Void main ()
{    Clrscr();
     int a, * al;
     float  b,* b1;
          al = &  a;
          b1 = & b;
     Cout << al << end l << b1<< end l;
          al ++ ;
          b1 ++ ;
     Cout << al << end l << b1 << end l ;
     getch ();
}
```

Q4) Attempt any four of the following :   **[4 × 4 = 16]**

a)   What are static class members? Explain important characteristics of static member function and static data members.

b) What are manipulators? Describe use of following manipulators in brief,

    i)   Setw   ii)   end *l*

c) Define a swap function template to swap two objects of same type.

d) What is the use of constructor. Comment on given statement." Default values can be assigned to argument in parameterized constructor."

e) Explain the output of following program.

```
# include <iostream. h>
# include <conio . h>
int top = 3;
class base
{
    Protected;
    int top;
    public :
        base()
        {
            top = 2;
            cout <<end l << top ;
        }
};
Class derived : public base
{
        Private ;
                int top;
        Public ;
                derived ()  : base ()
        { top = 1; cout << end l << top ;
          cout << end l << base :: top;
          cout << end l << :: top ;
        }
};
```

Void main ()

```
{
    derived d1 ;
}
```

Q5) Attempt any four of the following :   **[4 × 4 = 16]**

   a) Write a program to demonstrate dynamic binding using virtual function.

   b) Write a program to find how many objects. of a class has been created using static member function.

   c) Write a C++ program to overload '<<' and '>>' operators for class 'Time'. The data member of 'Time' class ax HH, MM SS, write necessary constructors. create 'n' objects of time class & display them in a suitable format.

   d) Write a program in C++ to write and read a string from / to a file.

   e) Identify errors in following code.

Class A

```
{
    int x, y;
    Public:
    void A (int a = 0, int b)
    { x = a ; y = b ;}
    void display()
    { cout << x << y ;}
};
    void main ()
    {
        A * ptr ;
        ptr → display ();
    }
```

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[5234]-24

M.C.A. (Science Faculty) - I, (Semester - II)
COMPUTER SCIENCE
CS - 205 : Database Management Systems
(2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Figures to the right indicate full marks.*

3) *Assume suitable data, if necessary.*

Q1) Attempt any four of the following :   **[4 × 4 = 16]**

a) Write a short note on data abstraction.

b) Explain the concept of attribute inheritance and aggregation with suitable examples.

c) Discuss various forms of insert command with suitable examples.

d) Consider the following .

Let R = (A, B, C, D, E) & F = {AB → C, CD → E, DE → B}

Is AB a superkey? Is ABD a superkey. Justify.

e) What do you mean by aborted transaction? Discuss two options used to handle it.

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

a) What is a deadlock? Explain deadlock prevention schemes.

b) Explain query processor in terms of its components.

c) Write a short note on QBE.

d) Define a key. Discuss primary key, candidatekey & foreign key with corresponding constraints.

e) Explain the commands used to remove & change records in table / relation with syntax & suitable examples.

Q3) Attempt any four of the following : [4 × 4 = 16]

    a)   Describe the types of user authorisations.

    b)   Explain DML

    c)   Discuss various join operations with suitable examples.

    d)   Differentiate specialization & generalization.

    e)   Consider the following transactions T_1 & T_2. Find out any two non-serial schedules which are serializable to a serial schedule $<T_2, T_1>$

T_1	T_2
read (x)	read (y)
x : = x - a ;	y : = y + y * 0.10
write (x)	write (y)
read (y)	read (z)
y : = y + a ;	z : = z - 100
write (y)	write (z)

Q4) Attempt any four of the following : [4 × 4 = 16]

    a)   Define the terms

        i)   Consistency   ii)   Automicity

        iii)   Durability   iv)   Isolation

    b)   Write a short note on user interfaces & tools.

    c)   Explain group by & order by clauses with examples.

    d)   Let   R = (A,B,C,D,E)

              $F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$

        Compute F^+

    e)   Explain the compactible matrix used in multiple granularity.

Q5) A)   Attempt any two of the following : [2 × 4 = 8]

        i)   Define a view. Explain it.

        ii)   What do you mean by null values? How null values can be tested in SQL.

        iii)   Explain view serializability.

B) Attempt the following : [4 × 2 = 8]

There are many movies released per year with different budgets. Many actors act in a movie & one actor can act in various movies with different signing amounts.

i) Identify the entities with required attributes & draw an ER diagram.

ii) Normalize & Design the given database with necessary constraints.

iii) Write a SQL to find the number of movies signed by each actor with their total signing amounts.

iv) Write a SQL to find the moview with maximum budget in a given year.

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[5234]-31

M.C.A. (Science Faculty) (Semester - III)

CS - 301 : Design and Analysis of Algorithms

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

Instructions to the candidates:

1) *All questions are compulsory .*

2) *Figures to the right indicate full marks.*

3) *Assume suitable data, if necessary.*

4) *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt all of the following :   [8 × 2 = 16]

a) 'The θ notation given better idea about time complexity'. Comment on this statement.

b) What is best - case and worst - case data for a sorting algorithm.

c) What is ordering paradigm of greedy method?

d) State the principle of optimality.

e) What are the implicit and explicit constraints?

f) What is a live node and a dead node?

g) What is a bipartite graph?

h) Specify the relationship between P, NP, NP - hard and NP - Complete Problems.

Q2) Attempt any four of the following :   [4 × 5 = 20]

a) Write DFS and BFS algorithm for a graph.

b) What is stability of a sorting algorithm? Is heapsort stable? Justify.

c) Obtain the optimal solution and maximum profit for following jobs and deadlines.

   n = 5 $(P_1, P_2, P_3, P_4, P_5)$ = (20 15 10 5 1)

   $(d_1, d_2, d_3, d_4, d_5)$ = (2 2 1 3 3)

P.T.O

d) Draw the state space tree with solution nodes for coloring the following graph with m = 3
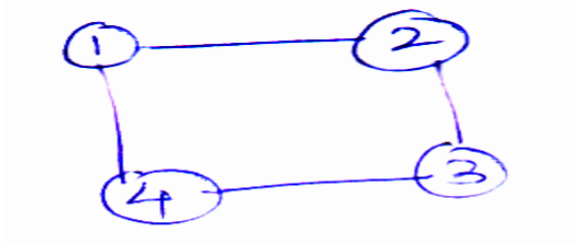
e) Obtain All-pair - Shortest path for the following graph using dynamic programming.

Q3) Attempt any four of the following :   [4 × 8 = 32]

a) Obtain minimum spanning tree of the following graph uisng prim's and kruskal's algorithm.

b) Compute the path and cost of path for the following cost matrix of a travelling salesperson problem using LCBB.

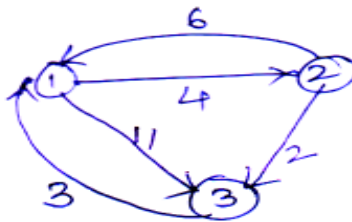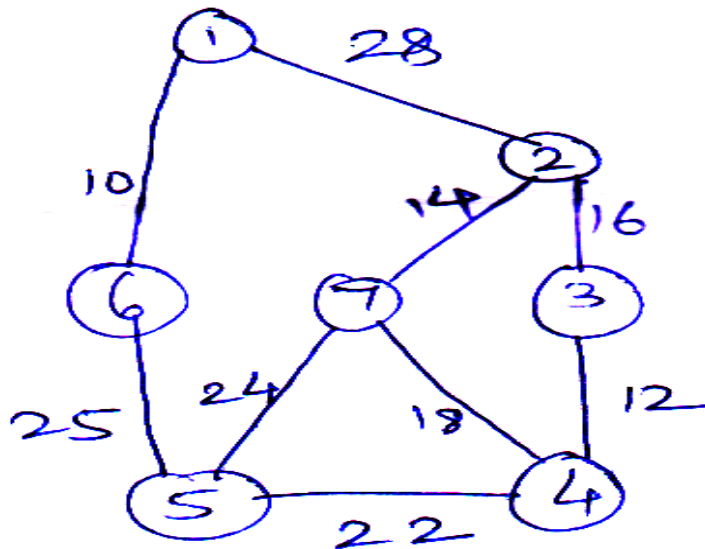$$\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$$

c) Compute the maximum flow for the following network.
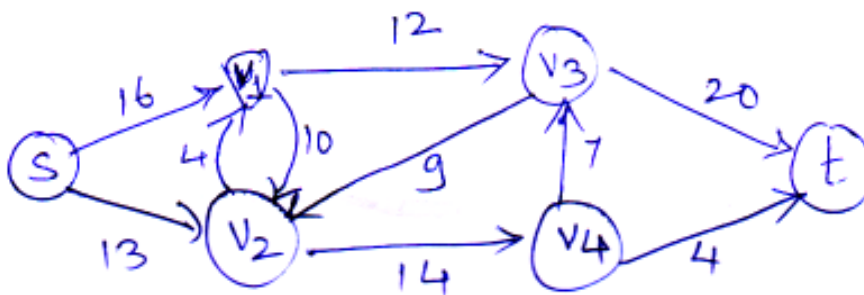
d) Obtain solution vector and maximum profit for the following instance of a o/I knapsack problem using merge - purge method.

n = 3, Capacity m = 6, P = (1 2 6), w = (2 3 4)

e) What is strassen matrix multiplication? Obtain and solve recurrence relation for this matrix multiplication.

Q4) Attempt any three of the following :   [3 × 4 = 12]

a) Compute time complexity of Quicksort.

b) Write an algorithm to perform binary search.

c) Explain sum of subsets problem.

d) Write control abstraction for greedy method.

e) Let X = aba, Y = ba. obtain minimum cost edit sequence to transform X to Y.

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[5234]-32

M.C.A. - II (Under Science Faculty) (Semester - III)
COMPUTER SCIENCE
CS - 302 : Computer Networks
(2008 Pattern)

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

Instructions to the candidates:

    1)   *Neat diagrams must be drawn whenever necessary.*

    2)   *All questions carry equal marks.*

    3)   *Assume suitable data if necessary.*

    4)   *All questions are compulsory.*

Q1) Attempt all of the following: **[8 × 2 = 16]**

    a)   Draw and explain mesh and star topology.

    b)   What is piggybacking? When it is useful?

    c)   Show the NRZ-L and Manchester encoding for bit stream 00110011.

    d)   Define Data Rate and Signal Rate.

    e)   Draw TCP/IP protocol suite.

    f)   Compare Adaptive and Non-Adaptive algorithms.

    g)   What is token management?

    h)   What is pipelining? In what situation pipelining protocols are useful?

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Write a note on point-to-point and broadcast network.

    b)   Explain virtual LAN.

    c)   Write a note on OSI reference model.

d) Explain circuit switching and advantages of circuit switching.

e) What is framing and explain any two methods of framing.

Q3) Attempt any four of the following : [4 × 4 = 16]

a) Explain the relationship between services and protocol.

b) What is congestion? Discuss data link layer policies to avoid congestion.

c) What are the disadvantages of IPV4? Explain the advantages of IPV6 over IPV4.

d) Write a note on Switched Ethernet?

e) What is the remainder obtained by dividing $x^7 + x^6 + x^5 + x^2 + 1$ by the generator Polynomial $x^3 + x + 1$

Q4) Attempt any four of the following : [4 × 4 = 16]

a) What are different characteristics of line coding?

b) Explain CSMA/CD.

c) What is channelization? Explain any two channelization protocols.

d) What are different transmission modes are available?

e) How can the hamming code be used in detecting and correcting errors?

Q5) Attempt any four of the following : [4 × 4 = 16]

a) Explain the concept of sliding window protocol.

b) What is Network Address translation? What are its advantages and disadvantages?

c) Explain pure ALOHA and slotted ALOHA.

d) Write a short note on Reservation and token passing.

e) Why length and padding fields are present in Ethernet frame?

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[5234]-33

M.C.A. (Science Faculty) (Semester - III)

CS - 303 : INTRODUCTION TO SYSTEM PROGRAMMING AND OPERATING SYSTEM CONCEPTS

(2008 Pattern)

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

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *All questions carry equal marks*

   3)   *Figures to the right indicate full marks.*

Q1) Attempt all of the following. [8×2=16]

   a)   What is spooling .

   b)   What is page fault

   c)   Define context switch

   d)   Give any 4 components of the system program

   e)   Define fork () system call.

   f)   What is aging.

   g)   Define turnaround time

   h)   What is multithreading.

Q2) Attempt any four of the following. [4× 4=16]

   a)   Explain the directory structure

   b)   Write short note on p-threads.

   c)   Explain in brief different techniques of memory allocation.

   d)   Explain linked file allocation method.

   e)   What are necessary conditions for deadlock to occur.

P.T.O

Q3) Attempt any four of the following   **[4 × 4 =16]**

 a) Consider the following set of processes,with the CPU burst time and arrival time

Process	Arrival time	Burst time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Illustrate the execution of these processes using preemptive SJF CPU scheduling algorithm calculate the average waiting time and average turn around time- Draw gratt chart.

 b) What are the physical addresses for the following logical addresses.

 i)   0,430   ii)   1,10   iii) 2,500   iv)   3,400

 c) What is resource allocation graph .What is its role in clealing with deadlock.

 d) Let the head of a cylinder with 200 tracks numbered 0 to 199 is currently at 50.If a request in queue are -14,45,54,62,90,102,160 What is the total head movements to satisfy these requests with the following disk scheduling algorithm

 i)   FCFS   ii)   LOOK

 e) Explain the method of polling.

Q4) Attempt any four of the following :   **[4 × 4 = 16]**

 a) Explain deadlock recovery technique.

 b) What is critical section.

 c) Explain the concept of device driver.

 d) Explain least frequently used (LFU) page replacement algorithm and most frequently used (MFU) page replacement algorithem

 e) Explain time sharing in O.S.

Q5) Attempt any four of the following   [4 × 4 = 16]

    a)   Write a note on semaphore.

    b)   Explain multiprocesser system.

    c)   Explain the concept of bounded buffer

    d)   Write a short note on Interrupt handler.

    e)   Explain

        i)   Virtual memory

        ii)   Process state.

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[5234]-34

M.C.A. (Science Faculty) (Semester - III)
CS - 305 : EVENT DRIVEN PROGRAMMING (WIN 32 SDK)
(2008 Pattern)

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

Instructions to the candidates:

  1) *All questions are compulsory.*

  2) *Figures to the right indicate full marks.*

  3) *Neat diagrams must be drawn whenever necessary.*

  4) *Assume suitable data, if necessary.*

Q1) Design the database for employee about salary and deductions (only table outline) :   **[12]**

  a)   Display all information about employee.

  b)   Delete a record of employee having emp - code as " cs - 1012"

  c)   Display the employee records having salary > 10,000

Q2) Write the program statements using win 32 APIS for any four of the following   **[4 × 5 = 20]**

  a)   Create login screen using three text fields namely name, password, and confirm password. Also add a login button. Accept information from user.

  b)   Collect the coordinates from the elient area when the lift mouse button is pressed and join them when the left mouse button is released.

  c)   Create menu like this : File, Edit, View, font Display, proper message on clicking a particular menu item.

  d)   Create a memory Metafile during the WM_CREATE message and display the message 100 times during the WM_PAINT message.

e) Draw a rectangle, an ellipse, a rectangle with rounded corners and two lines, but not in that order. The program statements should demonstrate that these functions that define closed area do instead fill them, because lines should be hidden behind an ellipse.

Q3) Answer in brief (any 8) **[8 × 2 = 16]**

a) What is the use of polyline() function in windows? write the syntax.

b) What will happen if WndProc contains WM_SYSCHAR, WM_SYSDEADCHAR, WM_ KEYUP, WM_ KEYDOWN message.

c) Define multitasking & multithreading.

d) What is capturing a mouse?

e) How to associate a DlgProc to a Dialog Box.

f) What are the advantages of dynamic link library?

g) What is vitual address space?

h) What are Queued and non-Queued messages?

i) What is the use of second parameter in winMain ()

j) What is a property sheet?

Q4) Justify True / False (any 6) **[6 × 2 = 12]**

a) Critical sections can co-ordinate threads among two or more processes.

b) Metafiles can be stored on hard Disks.

c) Timer messages are not asynchronous.

d) Every scrollbar has an associative "range" only.

e) The messages are not processed by Dialog Box procedure are passed on to defWindow procedure.

f) Textout is more efficient than Draw text.

g) Notepad is an example of SDI Application.

h) VK- SHIFT is a virtual key code.

Q5) Attempt any four   [4 × 5 = 20]

    a)   Difference between Modal and Modeless Dialog Box.

    b)   Write a note on "Device Context"

    c)   How to get text from clipboard?

    d)   What is MDI? Explain elements of MDI.

    e)   What is a difference between Win 32 and DOS.

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[5234]-41

M.C.A. (Under Science Faculty) (Semester - IV)
CS - 401 : INTRODUCTION TO UNIX AND UNIX INTERNALS
(2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*

2) *figures to the right indicate full marks.*

Q1) Attempt all of the following :   **[8 × 2 = 16]**

a)   If the System uses fair scheduler, how the process priority is calculated?

b)   Explain different types of pipes in brief.

c)   Explain in brief contents of mount table entry.

d)   Why text and data separate regions? Explain.

e)   Explain disk inode.

f)   Define uarea with all its fields.

g)   Write the syntax and use of system call 'kill'.

h)   Explain physical layout of unix system call.

Q2) State true or false. Justify your answer (any four)   **[4 × 4 = 16]**

a)   Kernel context layer number is bounded by interupt layer.

b)   Name of current terminal is defined by T2 shell variable.

c)   If 'exec' system call is successful, it never returns.

d)   After initiating process execution, its size cannot be changed dynamically.

e)   Zombie processes are never swapped.

Q3) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Explain buffer cache with all its advantages and disadvantages.

    b)   Which are different time related system calls? Explain any two in detail.

    c)   Which are different process states and transitions? Explain in detail with diagram.

    d)   Explain race condition for a locked buffer.

    e)   Explain the cases which rise for reading and writing from the pipe.

Q4) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Write a 'C' program to generate a parent process which will write and read using a pipe.

    b)   Trace and explain outcome of following Cprogram main()

```
{
  int local ;
  local = 1;
  if (vfork ())
{
  global = 2;
  local = 3;
  -exit ()
}
Print f ("global % d local % d \ n", global, local);
}
```

    c)   Write a shell script to read a file name from user, check whether it is regular, readable or writable file. Display the message.

    d)   Write a shell script to accept 2 command line arguements as two different numbers. Perform arithmetic operations on the numbers and display result.

    e)   Explain possible deadlock scenario for 'link' system call.

Q5) Attempt any four of the following :   **[4 × 4 = 16]**

   a)   What is page stealer process? Explain in detail.

   b)   Which are different data structures required for demand paging? Explain in detail.

   c)   Explain the components of system level context.

   d)   What is buffer pool? Explain with structure in detail

   e)   Which are different anomalies in processing the 'Sleep'? Explain in detail.

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[5234]-42

M.C.A. - II (Science Faculty) (Semester - IV)

CS - 402 : ADVANCED NETWORKING AND MOBILE COMPUTING

(2008 Pattern)

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

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *figures to the right indicate full marks.*

   3)   *All question carry equal marks.*

Q1) Attempt all :   **[8 × 2 = 16]**

   a)   What is P0P3?

   b)   Name the types of WEB documents.

   c)   Name the FTP modes.

   d)   Explain : multiple stream.

   e)   What is near & for terminal?

   f)   What is BTS?

   g)   Define Handover.

   h)   What is persistent connection in HTTP?

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

   a)   Write on short note on cellular system.

   b)   Explain FHSS.

   c)   Explain the services provided by user agent.

   d)   Write a short note on WAE

   e)   Write a short note on optimization.

Q3) Attempt any four of the following :   [4 × 4 = 16]

    a)   Write a short note on Bluetooth

    b)   What are the transaction services offered by WTP?

    c)   Write a short note on (OSS) operation and support subsystem in GSM.

    d)   Write an use of UDP

    e)   Explain shortly the signal propagation effects.

Q4) Attempt any four of the following :   [4 × 4 = 16]

    a)   Explain tunneling & encapsulation process in mobile IP

    b)   Explain different services provided by GSM.

    c)   Explain entities & terminology of mobile IP.

    d)   Differentiate SDMA, TDMA & FDMA.

    e)   Explain services provided by SCTP.

Q5) Attempt any four of the following :   [4 × 4 = 16]

    a)   Write a short note on FTP

    b)   Explain localization & Calling in GSM.

    c)   What is I - TCP? explain its advantages & disadvantages.

    d)   Explain push architecture.

    e)   Explain addressing mechanism in wireless LAN.

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[5234]-43

M.C.A. (Science Faculty) (Semester - IV)

CS - 403 : DISTRIBUTED DATABASE SYSTEMS

(2008 Pattern)

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

Instructions to the candidates:

    1)   ***All questions are compulsory.***

    2)   ***Neat diagrams must be drawn wherever necessary.***

    3)   ***Figures to the right indicate full marks.***

Q1) Attempt the following :   **[8 × 2 = 16]**

    a)   Justify true or false. Replication of data in DDBMS reduces reliability of distributed data.

    b)   State different types of failures in DDBMS.

    c)   What are correctness criteria for fragmentation.

    d)   What are the 3 characteristics on which the DDBMS architectual models are based.

    e)   Explain shared disk multiprocessor system.

    f)   State the objective of query processing.

    g)   What is nested transaction.

    h)   Define :

           i)   Reliability

           ii)   Availability

Q2) Attempt any four :   [4 × 5 = 20]

    a)   Explain top - down design process.

    b)   Define transaction. Explain different types of transaction.

    c)   What is distributed DBMS? Explain different layers of transparency.

    d)   Explain deadlock avoidance scheme used in DDBMS.

    e)   Explain client server architectural model.

Q3) Attempt any four :   [4 × 6 = 24]

    a)   Explain whether following schedule are serial or non - serial.

        S1 :{W2(x), R1(x), W1(x), C1, R3(x),W2(y), R3(y), R2(z), C2, R3(z),C3}

        S2 : {R2 (z), W2(x), W2(y), C2, W1(x), R1(x), A1, R3 (x) R3(z), R3(y) C3}

    b)   Consider the following query and transform it into optimized operator tree,

        Select salary, ename

        From emp, proj, asg, pay

        Where emp.eno = asg.eno

        and emp.title = pay.title

        and asg.pno = proj.pno

        and (bud>25,0000 or dur < 24)

    c)   Select ename, pname

        from emp,asg,proj

        where dur < 36

        and emp.eno = asg.eno

        and asg.pno = proj.pno

        And (title = "system admin" or asg.pno>"p4")

        Apply INGRES algorithm to the above query & illustrate the successive detachments & sub substitutions by giving monorelation subqueries generated.

d) Consider relation :

asg(eno, pno, resp, dur)

proj(pno, pname, bud, loc)

Assume the proj and asg are horizontally fragmented as

proj 1= pno < P2 and proj 2 = pno > = P2

asg 1 = pno < P2, asg2 = P2 < pno < P5 and asg 3 = pno > = P5

Transform the query into operator tree

Select pname

From asg, proj

where asg.pno = proj.pno

And bud < 25,000

and dur = 24

e) Let = Q = $\{q_1, q_2, q_3, q_4, q_5\}$ be the set of queries.

A = {A1,A2,A3,A4,A5} be the set of attributes.

S = {S1,S2,S3} be the set of sites

Use matrix A & B. Do the vertical fragmentations of set of attributes using BE algorithm.

$$
\begin{array}{c|ccccc}
 & A_1 & A_2 & A_3 & A_4 & A_5 \\
\hline
a_1 & 0 & 1 & 1 & 1 & 0 \\
a_2 & 1 & 1 & 1 & 0 & 0 \\
a_3 & 1 & 1 & 0 & 0 & 0 \\
a_4 & 0 & 0 & 0 & 1 & 1 \\
a_5 & 0 & 0 & 1 & 1 & 1 \\
\end{array}
\qquad
\begin{array}{c|ccc}
 & S_1 & S_2 & S_3 \\
\hline
a_1 & 25 & 6 & 0 \\
a_2 & 20 & 5 & 0 \\
a_3 & 15 & 0 & 0 \\
a_4 & 0 & 0 & 35 \\
a_5 & 0 & 25 & 20 \\
\end{array}
$$

Matrix A   Matrix B

Q4) Attempt any four :   [4 × 5 = 20]

    a)   Explain 3 phase commit protocol.

    b)   Explain distributed reliability protocol.

    c)   What are LRM commands? Explain in detail.

    d)   What are :

           i)   Join graph

          ii)   Query graph

        iii)   Wait for graph

        iv)   Precedence graph

    e)   Write a note on network partitioning.

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[5234]-44

M.C.A. (Under Science Faculty) (Semester - IV)

CS - 405 : OBJECT ORIENTED SOFTWARE ENGINEERING

(2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*
2) *figure to the right indicate full marks.*
3) *Neat Diagram must be drawn whenever necessary.*

Q1) Attempt the following: **[8 × 2 = 16]**

a)   What is forward engineering?

b)   Write the difference between generalization and specialization.

c)   What is the use of Include relation in use case diagram?

d)   Explain aggregation relationship with example.

e)   What is the significance of role names in class diagram?

f)   What are packages?

g)   What is black box testing?

h)   Briefly explain the Inception concept.

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

a)   Write a short note on various testing strategies.

b)   Draw a collaboration diagram for issuing books.

c)   Explain various features of object orientation with example.

d)   Write a note on Rational unified process.

e)   Explain various views in UML.

Q3) Attempt any four of the following :   **[4 × 8 = 32]**

    a)   Consider the various aspects of social networking site [facebook] and draw class diagram and use case diagram.

    b)   Draw a use case diagram of railway reservation system.

    c)   Write a short note on

        i)   Component Diagram

        ii)   Deployment Diagram

    d)   Draw state chart diagram for Insurance policy and sequence for online Insurance EMI Payment.

    e)   Draw an Activity Diagram and a object diagram for "Bus reservation system"

Q4) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Explain the steps involved in OOAD .

    b)   Explain inter class test case design.

    c)   Write a note on generic components of OO Design model.

    d)   Discuss importance and principles of modeling .

    e)   Write a note on agile modeling.

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[5234]-51

M.C.A. (Science) (Semester - V)

CRYPTOGRAPHY AND NETWORK SECURITY

(2008 Pattern)

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

Instructions to the candidates:

1) *Neat Diagram must be drawn wherever necessary.*

2) *figures to the right side indicate full marks.*

3) *Use of calculator is allowed.*

4) *Assume Suitable data if necessary.*

Q1) Attempt all of the following: **[8 × 2 = 16]**

a) What are the problems in Clear Text Passwords?

b) What are legal attacks?

c) What is Denial of service attack?

d) Draw a block diagram of triple DES.

e) List the contents of Digital Certificates.

f) Using Simple Columnar transposition technique construct the cipher text of the following plain text." UNIVERSITY OF PUNE NUMBER ONE IN INDIA". Assume number of columns = 6 and the order of columns is 2, 5, 3, 1, 4, 6

g) Consider the following Plain Text - "MCA COMPUTER SCIENCE FACULTY". The key to encrypt the text is an alphabet 4 places down the line. Using Caeser Cipher construct Cipher text.

h) How do we select an entry in a S-box based on the 6-bit input in S-box substitution step of DES?

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Justify' – "Non-repudiation does not allow the sender of a message to refuse the claim of not sending that message".

    b)   Give the Blowfish algorithm.

    c)   Explain broad level steps of IDEA.

    d)   Explain the working of RC5.

    e)   Define cryptography and explain conceptual view of cryptography.

Q3) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Write short note on Dual homed host architecture.

    b)   Explain the working of certificate based authentication.

    c)   Explain the 5 steps of PGP.

    d)   Give details of Encapsulating Security Format (ESP) format.

    e)   Write down the steps to verify digital certificates.

Q4) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Explain Screened Host Architecture of Firewall.

    b)   What is Biometric authentication? What is False Accept Ration and False Reject Ration?

    c)   Explain the major transactions supported by SET.

    d)   Explain the working of Certificate based Authentication.

    e)   Discuss the applications and benefits of IPsec.

Q5) Attempt any four of the following :   **[4 × 4 = 16]**

    a)   Consider the plain text. "MBA". Using Hill Cipher construct the cipher text. Let the key matrix be

$$\begin{pmatrix} 6 & 24 & 1 \\ 13 & 16 & 10 \\ 20 & 17 & 15 \end{pmatrix}$$

    b)   Consider the plain text "MCA SEMESTER FOUR". One time pad is QACDZMOUXGIJNVB. Using Vernam Cipher construct the cipher text.

c) Apply PlayFair technique and convert the following plain text into cipher text.

Plain text "EXAMINATION SECTION"

d) Consider the values of n = 17 and g = 13. Apply Diffie-Hellman Algorithm and generate

keys K_1 and K_2.

e) Consider the plain text "10". Let P = 7 and Q = 17. Construct the cipher text using RSA algorithm and also decrypt the cipher text you have constructed to get the original plain text.

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[5234]-52

M.C.A. III (Science Faculty) (Semester - V)
COMPUTER SCIENCE
CS - 502 : Internet Programming Using PHP
(2008 Pattern)

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

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Neat Diagram must be drawn wherever necessary.

    3)   Figures to the right indicate full marks.

Q1) Attempt all of the following: **[8 × 2 = 16]**

    a)   What are the features of PHP?

    b)   What is use of default parameter in function?

    c)   "HTTP is stateful protocol". Justify true /false.

    d)   State advantages of PEAR DB.

    e)   Define type juggling.

    f)   What do you mean by XML Parser.

    g)   What is a session?

    h)   What are the components of web services?

Q2) Attempt any four of the following (any four):   **[4 × 4 = 16]**

    a)   How are raster graphics advantageous than vector graphics?

    b)   Explain client server model with the help of diagram.

    c)   Explain any two methods of maintaining state.

    d)   Explain any four sorting functions in array.

    e)   What is file upload? Explain in detail.

Q3) Attempt any four of the following : [4 × 4 = 16]

    a)   Write short note on XML parser and DOM.

    b)   Write an example to validate the email-id. Using regular expression.

    c)   Write a PHP script to read directory name from user and display all files
         with their sizes in tabular formats.

    d)   Write steps in PEAR DB to access database.

    e)   Write a note on regular expressions.

Q4) Attempt any four of the following : [4 × 4 = 16]

    a)   Write PHP script for following :

         Create a class account (accno,cust_name).drive two classes from account
         as saving_acc (bal, min_amt) and current_acc (bal,min_amt) display a
         menu

         i)   Saving account   ii)   current account.

    b)   Write short note JSON responses.

    c)   Explain the features of XML.

    d)   Explain global variables in PHP.

    e)   Explain POP and HTTP protocols.

Q5) Attempt any four of the following : [4 × 4 = 16]

    a)   Write PHP program to perform the following operations:

         i)   union of two arrays.

         ii)   calculate sum of array elements.

         iii) check the array elements in negative or not using filter.

    b)   Write PHP script for the following

         Design a form to accept the directory name from the user, display the
         contents of the directory.

    c)   Explain ereg() built-in construct.

    d)   Explain execute and prepare statements.

    e)   Explain different types of argument passing to functions.

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[5234]-53

M.C.A. (Science Faculty) (Semester - V)
CS - 503 : DESIGN PATTERN
(2008 Pattern)

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

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Neat Diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*

Q1) Attempt the following: **[8 × 2 = 16]**

   a)   What is pipe and filter architectural pattern?

   b)   State the elements of Design pattern.

   c)   Which are the participants of Abstract factory design pattern?

   d)   What is the intent of Proxy design pattern?

   e)   State participants of Adptor design pattern.

   f)   What is intent of broker architectural pattern?

   g)   What is an Idiom?

   h)   "Idioms are less 'Portable' between programming language." Justify.

Q2) Attempt the following (Any four):   **[4 × 4 = 16]**

   a)   What is pattern? What are the pattern categories?

   b)   Explain the steps to implement Broker architectural pattern.

   c)   Explain the structure and consequences of model view controller architectural pattern?

   d)   Explain the stepwise refinement approach for layered architectural pattern.

   e)   Give the consequences of Black Board architectural pattern.

Q3) Attempt the following (Any four) :   [4 × 4 = 16]

a)   What are the benefits of prototype Design Pattern?

b)   Give the intent, motivation, applicability and implementation issues of singleton design pattern.

c)   What is the structure and participants of abstract factory design pattern?

d)   What are the benefits of proxy design pattern?

e)   Write a note on catalog organization of design pattern.

Q4) Attempt the following (Any four) :   [4 × 4 = 16]

a)   What is the Decorator design pattern? What are the uses of it?

b)   Explain the proxy design pattern with the help of structure and participants?

c)   Explain applicability and structure of Observer design pattern.

d)   Explain the participants and benefits of Decorator design pattern.

e)   What are the consequences of observer design pattern?

Q5) Attempt the following (Any four) :   [4 × 4 = 16]

a)   Explain strategy design pattern with the help of structure and implementation issues.

b)   Explain the structure and participants of command design pattern?

c)   What are the applicability and structure of Decorator pattern?

d)   Explain counted pointer Idioms with the steps of implementation.

e)   Explain motivation, applicability of proxy pattern.

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[5234]-54

M.C.A. (Science Faculty) (Semester - V)

CS - 505 : SOFTWARE TESTING & QUALITY ASSURANCE

(2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*
2) *All questions carry equal marks.*
3) *Figures to the right indicate full marks.*

Q1) Attempt all of the following: **[8 × 2 = 16]**

a) What are attributes of test case

b) Explain software review.

c) What is security testing?

d) Define Driver.

e) Explain testing document & help facility.

f) What are features of win runner?

g) What is the use of pareto diagram?

h) What is validation testing?

Q2) Attempt any four of the following :   **[4 × 4 = 16]**

a) State & explain testing principles.

b) Differentiate between manual and automated testing.

c) What is SQA plan?

d) Explain regression testing.

e) How to test - real time testing? Explain.

Q3) Attempt any four of the following :   [4 × 4 = 16]

    a)   Explain software measurement principle in software metrics.

    b)   Explain unit testing in detail.

    c)   Explain the concept of quality movement.

    d)   Explain white box testing in detail.

    e)   Write the steps for deriving test cases.

Q4) Attempt any four of the following :   [4 × 4 = 16]

    a)   What is brainstorming in pareto analysis?

    b)   What is quality control?

    c)   Explain formal technical review.

    d)   Explain top down integration testing.

    e)   Explain the concept : stress testing & performance testing.

Q5) Attempt any four of the following   [4 × 4 = 16]

    a)   Write short note on ISO 9,000 Quality standards.

    b)   What are building blocks of SQA.

    c)   What are McCall's Quality factors.

    d)   Write short note on load runner.

    e)   Explain in brief : Complexity matrics.

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