Total No. of Questions : 5]

SEAT No. :

P3512

[Total No. of Pages : 3

[5038] - 11
M.C.A. (Under Science Faculty)
'C' Programming
(Semester - I) (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) a) Trace the output [any two] **[2 × 4 = 8]**

i)
```
# define PRODUCT(a) (a*a)
main ( )
{
    int i = 3, j;
    j = PRODUCT(i + 1);
    Printf("\n%d",j);
}
```

ii)
```
main ( )
{
while ('a' < 'b')
print f("Malayalam is a palindrome");
}
```

iii)
```
main ( )
{
    Char s[ ]= "Mumbadevi";
    Char t[25];
Char *SS, *tt;
ss = s;
while (*ss++ = *tt++);
printf("\n%s", t);
}
```

P.T.O.

b) Find out the errors and explain (any two) **[2 × 4 = 8]**

i)
```
main ( )
{
char arr[8] = “Rhombus”;
int i;
for (i = 0; i <= 7; i++)
printf(“%d”, *arr);
arr++;
}
```

ii)
```
main ( )
{
float a[] = {13.24, 1.5, 1.5, 5.4, 3.5};
float *j, *k;
j = a;
k = a + 4;
j = j* 2;
k = k/2;
printf(“\n%d%d”, *j, *k);
}
```

iii)
```
main ( )
{
myfunction ( )
{
printf(“\n C is a simple minded language”);
printf(“\n other are of course no match”);
}
}
```

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

a) Explain any four String handling functions with example.

b) Explain call by value and call by reference with example.

c) Differentiate between while and do while structure.

d) What are different operations that we can perform on pointers.

e) What is purpose of Storage classes? Explain automatic and static storage class.

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

a) Write a C program to accept time in seconds and convert it into equivalent hours, minutes and seconds.

b) Write a C program to display first n prime numbers.

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

d) Write a C program to accept a decimal number and convert it into binary equivalent.

e) Write a C program to accept a String and check whether it is palindrome or not.

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

a) How can an array be passed to a function? Give example.

b) What is self referential structure? Explain with example.

c) Differentiate between text and binary files.

d) Write a note on C preprocessor.

e) Explain macro substitution in brief with example.

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

a) Write a C program to accept a positive integer and find the factors. e.g. $8 = 2 \times 2 \times 2$

b) Write a C program to accept file names as command line arguments and copy the contents of source file to target file.

c) Write a C program to accept and display information of 'n' books (id, title, author, publication, price) using structure.

d) Write a C program to calculate roots of a quadratic equation.

e) Write a C program to find sum of digits to a single number.
e.g. 739 = 1

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3513

[Total No. of Pages : 2

[5038] - 12
M.C.A. (Under Science - Faculty)
COMPUTER SCIENCE
Computer Architecture
(Semester - I) (2008 Pattern)

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

Instructions to the candidates:-

1) ***All questions are compulsary.***
2) ***Draw neat diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

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

a) What is full adder? Explain its working.

b) What does 'VESA' stands for in computer bus structure? State its any two features.

c) Explain four segment instruction pipeline.

d) Write short note on 'Instruction cycle' in Microprocessor.

e) Explain concept of parallel processing.

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

a) Explain level triggered J - K flip flop. How race around condition can be removed?

b) Explain following addressing modes with an example.

i) Register

ii) Register Indirect

iii) Based

iv) Direct

c) Explain dual slope analog to digital converter. State its advantages over single slope ADC.

P.T.O.

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

a) Explain any two components of microprocessor.

b) What are the features of RISC architecutre.

c) Differentiate between the real mode and protected mode operation of microprocessor.

d) Explain 3 : 8 decoder using logic gates.

e) What is interrupt? Explain hardware and software interrupt in details.

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

a) Explain 'Universal Serial Bus'.

b) State any four features of pentium - pro microprocessor.

c) Explain with neat block diagram I/O interface.

d) Explain J - K flip - flop

e) Explain successive approximation ADC.

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 control word format for I/O mode of IC8255.

c) Explain 'T' flip - flop. How it is used to design 3 bit asynchronous up - down counter.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3514

[Total No. of Pages : 3

[5038] - 13
M.C.A. - I (Under Science Faculty)
MATHEMATICS
CS - 103 : Mathematical Foundation
(2008 Pattern) (Semester - I)

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 : **[16]**

a) Let A = {a, b, c, d}. Find the power set of A. How many elements are there in power of power set of A.

b) Prove that $(A \cup B)^C = A^C \cap B^C$

c) Give an example of function which is not one one. Justify your answer.

d) Find g.c.d. of 4512 and 3411 by Euclidean Algorithm and hence express it as linear combination of 4512 and 3411.

e) Let ~ be an equivalence relation on a set A show that it forms the partition.

f) Let p be a prime number. $a,b \in Z$ be such that p |ab show that either p|a or p|b

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

a) Give an example of arelation with the property that it is reflexive and symmetric but not transitive. Justify your answer.

b) Find the solution for the following system of congruences.

$x \equiv 1 \pmod 5$, $x \equiv 3 \pmod 7$, $x \equiv 8 \pmod{23}$

c) Find an inverse of 2 modulo 17.

d) Find the remainder when 2^{340} is divided by 31

e) Let $a,b,m \in Z$, $m \neq 0$. If $a \equiv b \pmod m$ then prove that $a^k \equiv b^k \pmod m$ for any $k \in N$.

P.T.O.

f) Find the quotient and remainder when polynomial
$q(x) = x^5 + 9x^4 + 12x^3 + 5x + 6$ is divided by the polynomial $p(x) = x^2 - 2$.

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

a) Find order of the following permutation.

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 \\ 5 & 6 & 8 & 7 & 9 & 1 & 10 & 2 & 11 & 3 & 12 & 4 \end{pmatrix}$$

b) Write the composition table of Z_7 under the operation $\times_7$. and $+_7$ (Multiplication modulo 7 and addition modulo 7 respectively).

c) Prove that $U(10) = \{\overline{1}, \overline{3}, \overline{7}, \overline{9}\}$ is a group with respect to the operation multiplication modulo 10(X_{10}).

d) Define odd permutation. Determine whether the permutation σ given below is odd or not

$$\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \\ 1 & 3 & 10 & 2 & 11 & 4 & 5 & 9 & 6 & 7 & 8 \end{pmatrix}$$

e) Find all roots of the polynomial

$$f(x) = x^3 + 3x^2 + 3x + 1$$

f) Define the composition of two functions Also prove that
$(gof)^{-1} = f^{-1}og^{-1}$

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

a) Find the inverse of matrix by adjoint method.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 1 \end{bmatrix}$$

b) Solve the system of equations by using cramer's rule

$$x + y + z = 6,\ 2x + 4y + 3z = 19,\ x + 3y + 2z = 13$$

c) Let G be a group show that inverse of an element a in G is Unique.

d) What is coefficient of x^5y^8 in $(x+y)^{13}$.

e) Determine whether the function $f: Z \times Z \to Z$ defined by $f(m,n) = m^2 + n^2$ is onto or not.

f) With the help of Venn diagram prove that $A \cup (A \cap B) = A$ and $A \cap (A \cup B) = A$.

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

a) Draw the truth table for $(p \vee \neg q) \to (p \wedge q)$ Is it a contradiction?

b) Show that $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent by developing a series of logical equivalences.

c) Show that $(p \to q) \vee (p \to r)$ and $p \to (q \vee r)$ are logically equivalent by constructing the truth table.

d) Show that following equation has no solution in integers by method of exhaustive proof.

$$x^2 + 3y^2 = 8$$

e) Prove the following statement by method of contradiction. "If 5n + 2 is odd then n is odd".

f) Let Q(x, y) denote the statement "$x = y + 3$". What is truth value of proposition Q(1, 3), Q(3, 0), Q(0, 3) and Q(2, 1).

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3515

[Total No. of Pages : 4

[5038] - 14
M.C.A. (Science Faculty)
MATHEMATICS
Graph Theory
(2008 Pattern) (Semester - I)

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 : **[16]**

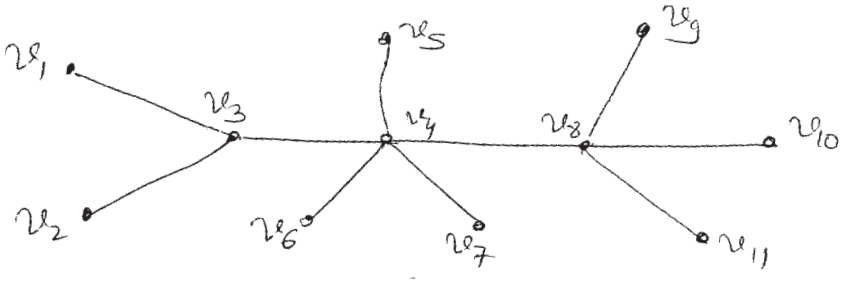
a) Explain Handshaking lemma.

b) Draw the following graphs.

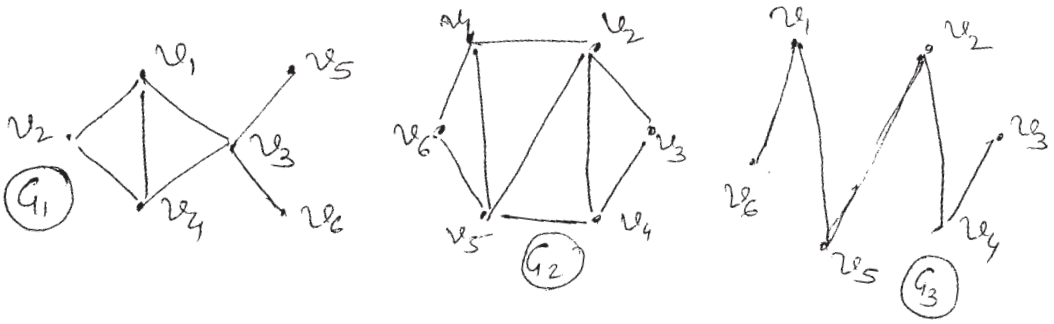
i) Bipartite graph on 10 vertices

ii) Complete graph on 6 vertices.

c) Find the eccentricity of each vertex in the trees given below. Find the centre, radius and diameter of the following trees.



d) For the graph G_1, G_2 and G_3 given below , find $G_2 \oplus (G_1 \oplus G_3)$.



P.T.O.

e) Solve the following recurrance relation.

$$7a_{n+2} - 8a_{n+1} + a_n = 0,\ a_0 = 0, a_1 = 1$$

f) Draw the graph of following incidence matrix and find the square of underlying graph (composition of graph with itself)

$$I(G) = \begin{array}{c} \\ v_1 \\ v_2 \\ v_3 \\ v_4 \\ v_5 \end{array} \begin{array}{c} \begin{array}{ccccccccccc} e_1 & e_2 & e_3 & e_4 & e_5 & e_6 & e_7 & e_8 & e_9 & e_{10} & e_{11} \end{array} \\ \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 2 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 0 & 0 & 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \end{bmatrix} \end{array}$$

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

a) Can there be a directed graph with 6 vertices where the outdegrees are 2, 4, 1, 1, 5 and 2 and the indegrees are 2, 3, 4, 1, 0 and 5?

b) Determine the minimum number of vertices in the simple graph with 23 edges. Also draw such graph.

c) Find the exponential generating function for the number a_r of r - letter words with no consonants used more than once (vowels may be repeatd)

d) Define complement of a graph and self complementary graph.

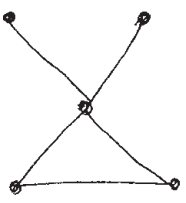
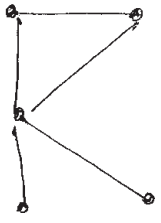
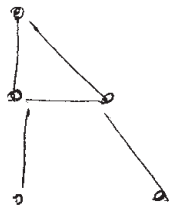
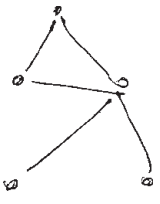
e) Any connected graph with n vertices and $n - 1$ edges is a tree.

f) Write the fusion algorithm for the connectness of the graphs.

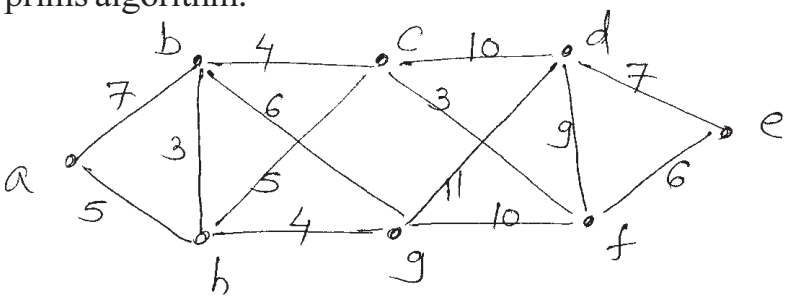
Q3) Attempt any four of the following : **[16]**

a) Prove that a simple graph with n vertices must be connected if it has more than $\frac{(n-1)(n-2)}{2}$ edges.

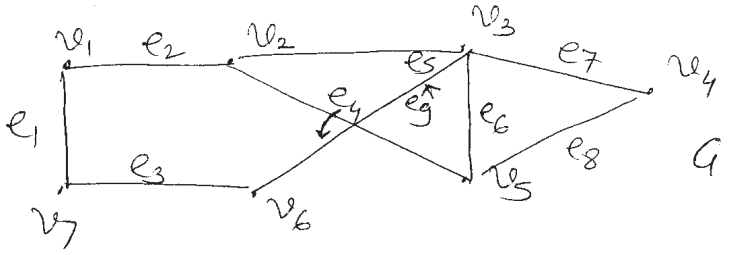
b) Which of following pairs of graphs are isomorphic label the vertices of each graph appropriately to bring out the isomorphism.

c) Find the minimal spanning tree for following connected weighted graph using prims algorithm.



d) Let G be the graph given below. Find G[U] and G[F], where $U = \{v_1, v_2, v_3\}$ and $F = \{e_2, e_4, e_6, e_8\}$ and G(X) means G induced by set X.



e) Find the Hamiltonian circuit in the nanogon graph. Draw it.

f) Draw the arborescence and express in polish notation, the expression is

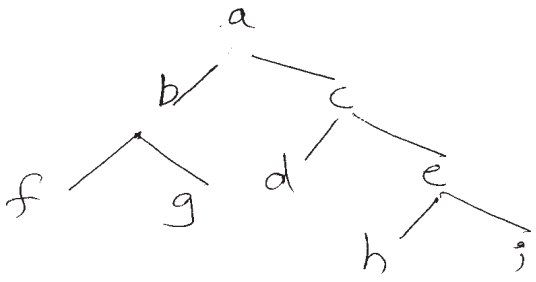
$$f + \frac{abc}{\frac{d}{g} + e^7}$$

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

a) Show that if a simple graph G is connected then its complement is $\overline{G}$ not connected Hence show that if G is a simple connected graph and *v* is not cut vertex of G then *v* is cut vertex in $\overline{G}$.

b) Find the maximum vertex connectivity of a graph with 6 vertices and 14 edges Draw the graph showing that they are achieved.

c) Obtain the preorder and postorder traversals for the following binary tree.



d) Write the steps of Breadth first search algorithm.

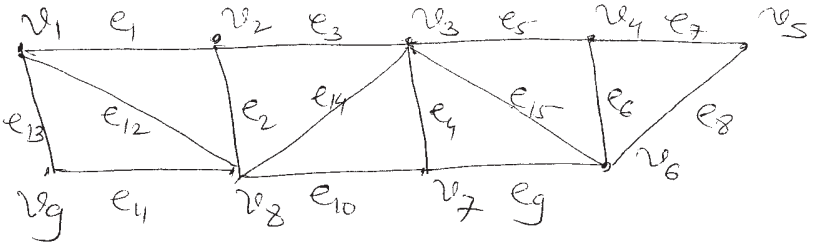
e) Solve the recurrance relation.

$$a_n - 5a_{n-1} + 6a_{n-2} = 5 + 6n$$

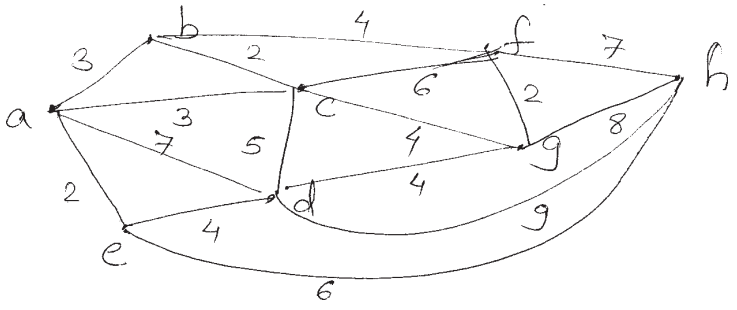
f) Write a note on travelling sales man problem.

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

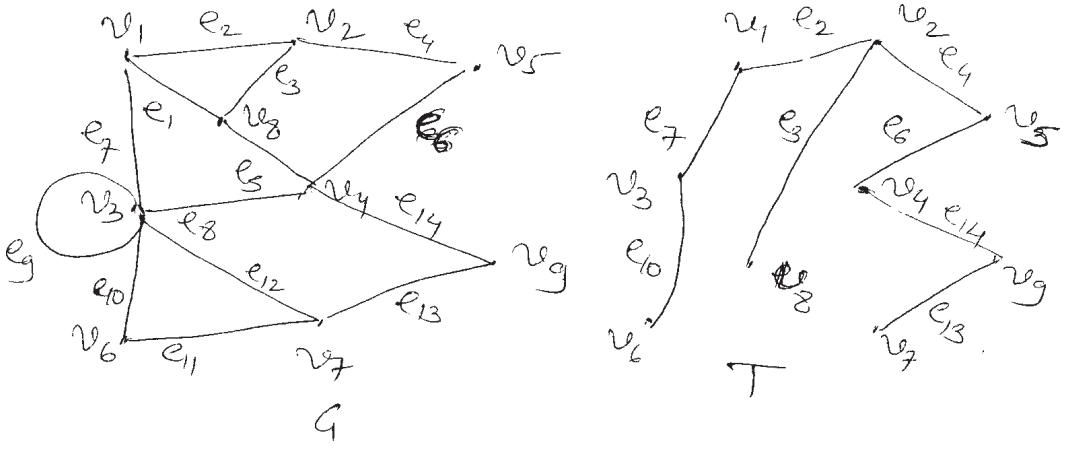
a) Using Fleury's algorithm find the euler tour in the following graph G.



b) Using Dijkstra's algorithm. Find the shortest path from vertex 'a' to all vertices in the weighted graph below.



c) Find all fundamental circuits (cycles) and cutsets of following graph G with respect to T.



♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3516

[Total No. of Pages : 3

[5038] - 21
M.C.A. - I (Science Faculty)
CS - 201 : DATA AND FILE STRUCTURE USING 'C'
(2008 Pattern) (Semester - II)

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

Instructions to the candidates:-

1) ***Figures to the right indicate full marks.***
2) ***All questions are compulsory.***
3) ***Assume suitable data, if necessary.***

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

a) Define ADT. Explain two properties of ADT and state advantages of ADT.

b) Write short note on Dense indexing.

c) i) Differentiate array versus linked list

ii) Justify - Linked list is abstract data type.

d) Write "C" function to insert a node in dynamic linked list at beginning and at the end consider following node -

```
struct node
{int data;
struct node * next i };
struct node *start = null;
```

e) State and explain operations on stack using array representation.

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

a) Define Graph. How graphs are represented using adjacency matrix and adjacency lists? Explain with example.

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

c) Write following 'C' functions for static queue representation.

i) Isqueuefull

ii) Add(Q)

P.T.O.

d) Define doubly linked list. Define node structure of DLL. Write 'C' code to create doubly linked list.

e) Explain the following rotations which are performed to balance a tree.

i) LL rotation.

ii) LR rotation

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

a) Convert following infix expression to postfix expression.

$$((A + B) \wedge C - (*D * E) / F)$$

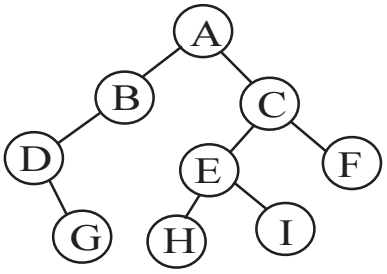
Show stack contents at each step.

b) Define priority queue. List two types of priority queue. What are the examples of priority queue?

c) What is Generalised linked list? Represent following polynomial using GLL.

$$x^{10}y^3z^2 + 2x^8y^3z^2 + 3x^8y^2z^2 + x^4 + y^4 + z + 6x^3y^4z + 2yz$$

d) Find preorder, postorder and inorder tree traversal for following binary tree.



e) Sort following data using Heap sort. Show all iterations.

80, 75, 67, 15, 32, 64, 57, 2

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

a) Write a 'C' function to calculate length of singly linked list.

b) Write a algorithm to add two polynomials.

c) Construct BST for following elements. Show all interations.

15, 11, 13, 8, 9, 17, 16, 18

d) Write short note on secondary indexing.

e) Write algorithm for Insertion sort.

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

a) Write the steps of DFS algorithm.

b) Sort the following data using quick sort.

24, 30, 27, 32, 11, 21, 19

show all iterations

c) Write a 'C' function of sequential search method for an array of integer.

d) Explain B^+ tree deletion algorithm.

e) Give advantages and disadvantages of sparse index.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3517

[Total No. of Pages : 4

[5038] - 22
M.C.A. (Part - I)
COMPUTER SCIENCE
CS - 202 : Theoretical Computer Science
(Semester - II) (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 wherever necessary.***

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

a) Define Regular Grammar.

b) Define LBA with tuples.

c) Describe in english and given the language set for the following regular expression.

$$(a+b)^* a \quad (a+b)^* a \quad (a+b)^*$$

d) Define unit production. Give one example.

e) Let relation R = {(1, 2), (2, 3), (3, 1)} on set {1, 2, 3}. Find R^+ and R*.

f) Define prefix and suffix of a string.

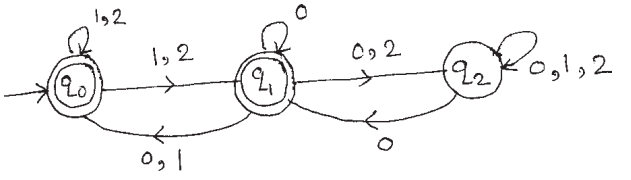
g) What are the rules for eliminating $\in$ - productions.

h) Let A = {1, 2, 3} and B = {3, 4, 5}. Find $(A \cap B)^*$ and $(A - B)^*$.

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

a) Construct CFG for $L = \{a^n b^n c^m d^k \mid n, m \geq 0, k \geq 1\}$.

b) Construct DFA equivalent to the following NFA.



P.T.O.

c) Construct PDA for $L = \{ww^R / w \in (a,b)^*\}$

d) Check whether $L = \{a^n b^m c^n / n, m \geq 0\}$ is regular? Justify your answer.

e) Construct the following grammar with out useless symbols if any. Justify your answer.

S → aAB/BC/aB
A → bA/aC
B → bBB/aS/b
C → CA/BC
D→ aD/bs/a

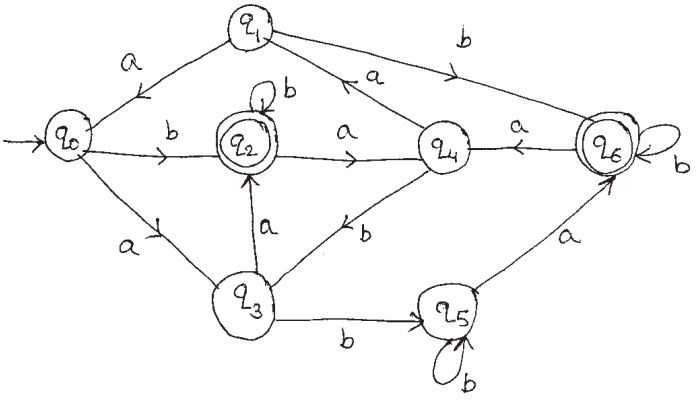
Q3) Attempt any 4 of the following : **[4 × 4 = 16]**

a) Prove that CFL's are closed under Union. Give one example.

b) Construct T.M. for $L = \{a^n b^m c^{n+m} / n, m \geq 0\}$.

c) Construct Moore machine which output 'EVEN' or 'ODD' according to the number of 1's encounter is even or odd over {0, 1}

d) Minimize the following DFA.



e) Construct PDA equivalent to the following CFG.

S → aAb/aS

A→ Bb/a

B→ Sa/b

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

a) Convert the following CFG into GNF.

$S \rightarrow AB$

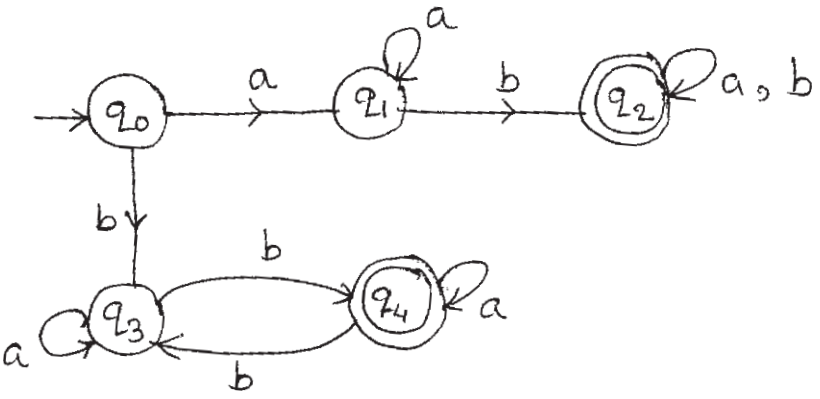
$A \rightarrow SB/a$

$B \rightarrow AB/b$

b) Construct NFA for the R.E. (11 + 0)* (00 + 1)*

c) Prove that if language L is accepted by a PDA using empty stack then L can be accepted by PDA using Final state.

d) Construct Regular Grammar for the following DFA.



e) Construct PDA for $L = \{a^n b^m c^n d \mid n, m \geq 1\}$.

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

a) Convert the following CFG into CNF.

$S \rightarrow aAab/Aba$

$A \rightarrow aS/bB$

$B \rightarrow ASb/a$

b) Explain different types of Turing machines with examples.

c) Construct the DFA to accept all strings over {a, b} in which every even position is the string is occupied by 'b' and every odd position by 'a'.

d) Construct CFG equivalent to the following PDA.

$$M = (\{q_0, q_1\}, \{0,1\}, \{X, z_0\}, \delta, q_0, z_0, \phi)$$

where δ is given as

$\delta(q_0, 0, z_0) = (q_0, Xz_0)$

$\delta(q_0, 0, X) = (q_0, XX)$

$\delta(q_0, 1, X) = (q_1, \in)$

$\delta(q_1, 1, X) = (q_1, \in)$

$\delta(q_1, \in, X) = (q_1, \in)$

$\delta(q_1, \in, z_0) = (q_1, \in)$

e) Construct Mealy machine equivalent to the following moore machine.

M = $(\{q_0, q_1, q_2, q_3\}, \{a, b\}, \{0, 1\}, \delta, \lambda, q_0)$ where

δ	a	b	λ
q_0	q_1	q_3	1
q_1	q_3	q_1	0
q_2	q_0	q_3	0
q_3	q_3	q_2	1

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3518

[Total No. of Pages : 3

[5038] - 23
M.C.A. - I (Science Faculty)
CS - 203 : Object Oriented Programming (C++ Programming)
(2008 Pattern) (Semester - II)

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

a) Define

i) Class

ii) Data hiding

b) List any four operators which can not be overloaded.

c) Write syntax for read ( ) and get ( ) functions for file handling in C++.

d) What is compile time polymorphism?

e) Define pure virtual function. What is its advantage?

f) Give the syntax for writing function template.

g) Differentiate between new and malloc.

h) Write any two characteristics of constructors.

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

a) How try block invokes a function that generates an exception? Explain with example.

b) Write a C++ program to append the contents of one file to another file. (Do not create third file)

c) Give rules for operator overloading.

d) What is an application of this pointer? Explain with example.

P.T.O.

e) Give the output for the following code segment.

i) cout. width (5);

cout <<543<<13<<"\n";

ii) cout. precision (3);

cout <<sqrt(2) <<"\n";

cout <<3.14159 <<"\n";

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

a) Consider the following class definition

```
class time
{
    int    hh, mm;
    public : // member function definition
};
```

write functions for overloading folllowing operators :

i) Binary +

ii) Binary –

b) Write a C++ program for class employee with eno, ename, esal, edesig as data members. Write necessary member functions for

i) Input n records

ii) Display n records

iii) Search an employee salary where esal > m

(m is input from user)

iv) Search an employee by designation.

c) Create an abstract class called "shape" with one method called area. Derive a class "circle" having member radius and another class "Rectangle" having members length and breadth. Override the method area in both these classes. Write appropriate constructors for the classes. Write main to calculate the area of a circle and rectangle.

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

a) How an exception can be rethrown? Explain with example.

b) What is an inline function? Give conditions where a function may not work as inline.

c) Explain the following flags with example.

i) ios :: showpoint

ii) ios :: showpos

d) What is class template? Explain with example.

e) Consider following class definition :

```
Class A
{
        int a;
        int b;
   public;
        A(int i, int j) : // consider following definiton
        {
        }
};
main ( )
{
        A (3, 5);
}
```

Give the values for a and b variables if the constructor A is defined as

i) A(int i, int j) : a(i), b(2 * j)

ii) A(int i, int j) : b(i), a(i + j)

iii) A(int i, int j) : a(i), b(a + j)

iv) A(int i, int j) : b(i), a(b * j)

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

a) Write rules for virtual function.

b) Explain multiple inheritance with example.

c) What is an iterator? Explain any two types of iterators.

d) Explain error handling functions for files in C++.

e) Write a template function for implementing insertion sort algorithm & write main function to test it.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3519

[Total No. of Pages : 5

[5038] - 24
M.C.A. (Computer Science)
Database Management Systems
(Semester - II) (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 all of the following : **[8 × 2 = 16]**

a) Explain the difference between logical and physical independence.

b) Define the term entity and attribute.

c) What is referential integrity?

d) Define the schema and instance.

e) State 2 phases in 2 phases loking protocol.

f) Write the basic claueses required to write SQL.

g) State the concept serializable to serial schedule.

h) Distinguish between weak and strong entity.

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

a) What is database management system? Give various application areas of DBMS.

b) Explain data abstraction.

c) Explain DML & DDL.

d) Difference between generalization & specialization.

P.T.O.

e) The following is the list of events in an interleaved execution of set of transaction, T_1, T_2, T_3 with two phase locking protocol.

Time	Transaction	Code
t_1	T_1	LOCK (A, S)
t_2	T_2	LOCK (B, S)
t_3	T_3	LOCK (A, X)
t_4	T_1	LOCK (C, S)
t_5	T_2	LOCK (A, X)
t_6	T_3	LOCK (D, X)
t_7	T_1	LOCK (A – C)
t_8	T_2	LOCK (D, S)
t_9	T_3	LOCK (C, X)
t_{10}	T_1	COMMIT
t_{11}	T_2	LOCK(C, S)

Construct a wait - for a graph according to above requests. Is there dead lock at any instance? Justify.

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

a) What do you mean by pattern maching?

b) Explain loss less join decomposition with example.

c) Explain Normalization process up to 3NF

d) Explain Recoverable & non - recoverable schedules.

e) Compute the closure of following set F of function dependencies for relation schema.

R(A, B, C)

F = $A \rightarrow B$, $B \rightarrow C$

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

a) Explain shadow copy.

b) Consider following RDB.

student (Roll No, name, address)

subject (subcode, subname)

Marks (Rollno, subcode, Marks)

Write the following queries.

i) List all the students whose name start with 'R'.

ii) List all the students having marks above 60.

iii) Find average marks of each students along with name of subject.

iv) Find how many students have failed in 'DBMS' subject.

c) Consider the following transaction.

T_1	T_2
Read (X)	Read (Y)
$x = x - 70$	$y = y + 10$
Write (x)	Write (y)
Read (y)	Read (z)
$y = y + 70$	$z = z - 5$
write (y)	Read (x)
	Write (z)
	$x = x - 15$
	write (x)

Give at least 2 non - serial schedules that are serializable.

d) Explain Thomas write rule.

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

a) A reputed general hospital has decided to computerize their operations. In the hospital many doctors are working personal information of doctors are maintained to get them fixed salary per month. The patients are admitted to the hospital into the room. They are treated by various doctors. Some times patients performs certain pathological tests which carried out into the labs.

i) Identify all entities.

ii) Identify all relations and connectivities among entities.

iii) Construct E – R diagram for above.

b) Following are the log entries at the time of system crash.

[Start, T_1]

[Write T_1, A, 5]

[Commit, T_1]

[Start, T_2]

[Write, T_2, B, 10]

[Write, T_2, D, 15]

[Commit, T_2]

[Check point]

[Start, T_3]

[Write, T_3, B, 20]

[Start, T_4]

[Write T_4, C, 10] ← System crash

If deferred update with check point is used, what will be the recovered procedure?

c) Check given schedule is serializable?

T_1	T_2	T_3
		Read (C)
		Read (B)
Read (A)		
Write (A)		
		Write (B)
		Write (C)
	Read (C)	
Read (B)		
Write (B)		
	Read (B)	
	Write (B)	
	Read (A)	
	Write (A)	

d) Consider the following entities and Relationship Game (Gno, gname, no_of_player, coach_name, captain)

player (pno, pname)

Game and player are related with many tomany relationship create RDB and solve. the following queries.

i) List the name of player playing cricket & Hockey.

ii) Count the total number of player, whose coach name is "Mr. Dev".

iii) List the name of players playing game Basket ball.

iv) Delete all the players name who play cricket

e) Write short note on dead lock detection & recovery.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P3520

[Total No. of Pages : 4

[5038] - 31
M.C.A. (Science Faculty)
COMPUTER SCIENCE
Design and Analysis of Algorithms
(Semester - III) (2008 Pattern)

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

Instructions to the candidates:-

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

Q1) Attempt all **[8 × 2 = 16]**

a) Define Asymptotic Notations.

b) Discuss the time complexity of Binary search in the best case, worst case and average case.

c) Write control abstraction for divide and conquer strategy.

d) Define explicit and implicit constraints.

e) Define NP - complete and NP - hard problem.

f) What do you mean by branch and bound? Give an example of an application where this technique might be useful.

g) What do you mean by maximum bipartite matching?

h) What is satisfiability problem?

Q2) Attempt any four **[4 × 5 = 20]**

a) Write Quick sort algorithm and obtains it's Best case and Worst case running time.

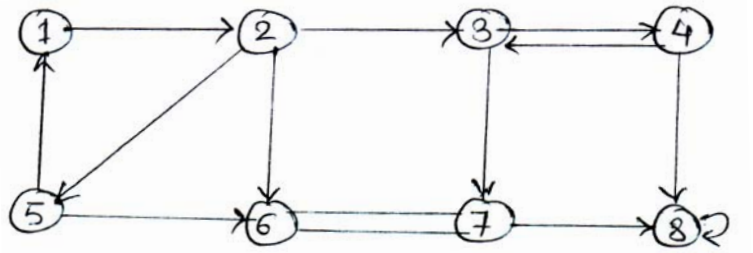
b) Describe the Backtracking method used to solve 4 - Queen problem.

c) Find an optimal solution to the knapsack problem using greedy method n = 3 m = 20.

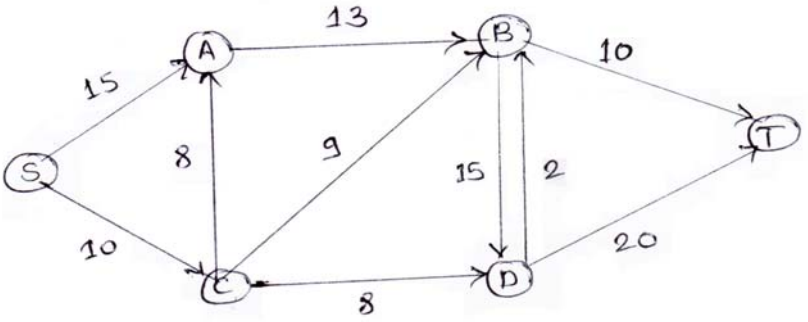
p = (25, 24, 15) w = (18, 15, 10)

P.T.O.

d) Find the strongly connected components of given graph G.



e) Find out the maximum flow from the network, where S is source and T is sink.

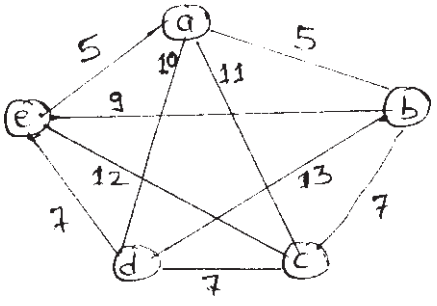


Q3) Attempt any four **[4 × 8 = 32]**

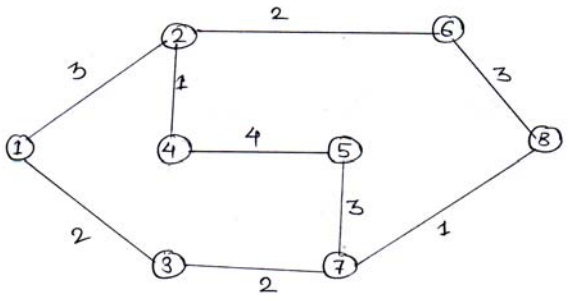
a) Obtain the reduced cost matrix for the Travelling sales person instance given by the cost matrix.

∞	3	7	12	8
6	∞	3	12	10
5	8	∞	6	18
3	5	9	∞	11
14	18	8	9	∞

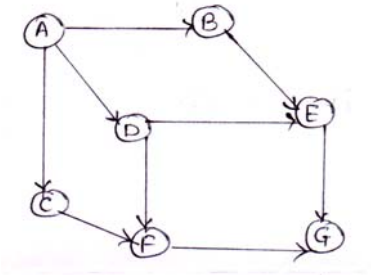
b) Differentiate between prim's and kruskal's algorithm? Explain kruskal's algorithm to obtain minimum spanning tree and apply it on the following graph.



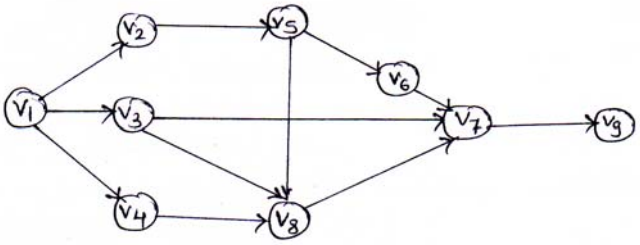
c) Explain Dijkstra's algorithm. Apply the algorithm on the directed graph given below.



d) Explain BFS, write an algorithm of BFS, Illustrate it on the following graph. What it its time complexity?



e) Explain topological sort algorithm for the directed graph. Illustrate it on the following graph.



Q4) Attempt any four **[3 × 4 = 12]**

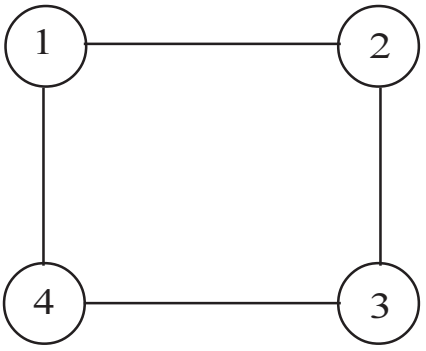
a) Explain Huffman's algorithm for encoding. What is an optimal Huffman code for the following set of frequencies.

Characters	Frequency
A	12
B	40
C	15
D	08
E	25

b) Solve the following 0/1 knapsack problem using dynamic programming.

n = 4, m = 18, w = (3, 8, 6, 4), p = (9, 10, 12, 9)

c) What is m - colorability graph problem? Find out all possible solution with m = 3 for the following graph.



d) Obtain optimal solution for the following object n = 7
profits (3, 5, 20, 18, 1, 6, 30) deadlines (1, 3, 4, 3, 2, 1, 2)

e) Find out solutions for sum of subsets using fixed tuple size state space tree.

where n = 5 m = 30

w = {5, 7, 10, 13, 15}

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3521

[Total No. of Pages : 2

[5038] - 32
M.C.A. - II (Science)
COMPUTER SCIENCE
CS - 302 : Computer Networks
(Semester - III) (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) Define Defacto and Dejure standard.

b) List the supporting protocols of IP in TCP/IP model.

c) List any two disadvantages of Mesh topology.

d) What is Jitter?

e) What is Pipelining?

f) i) Class____ address are used for unicasting.
ii) Class _____address are used for multicasting.

g) Find the Class, Netid, Hostid and Subnetid for the IP address 194.30.54.17/16.

h) What is supernetting?

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

a) What are the different strategies for transition from IPv4 to IPv6? Explain.

b) Compare circuit, message and packet switching.

c) Explain PAR protocol.

d) Explain Pure and Slotted ALOHA.

e) Explain the difference between Bridged and Switched Ethernet.

P.T.O.

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

a) Explain CSMA/CD.

b) What is Protocol? Explain the key elements of protocols.

c) Explain the factors affecting the protocol efficiency.

d) What is the difference between a unicast , multicast and broadcast address in IEEE 802.3 MAC Frame?

e) Construct the CRC message for m= 100001100101 and the generator polynomial is $X^5 + X^3 + X + 1$.

Q4) Attempt <u>any four</u> of the fOllowing: **[4 × 4 = 16]**

a) Give the names of the layers of OSI model which perform the following tasks:

i) Define Frames.

ii) Provide access for the end users.

iii) Format and code conversion services.

iv) Route determination.

b) Compare Coaxial cable Fiber Optics.

c) Explain CDMA.

d) What is congestion? Explain any two congestion control policies.

e) What is full - duplex Ethernet? Why there is no need for CSMA/CD in a full - duplex Ethernet LAN?

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

a) Explain the design issues of layers.

b) Explain NAT.

c) What are the different Transmission Modes? Explain.

d) What is framing? Explain any two methods.

e) Explain OSI model.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3522

[Total No. of Pages : 3

[5038] - 33
M.C.A. - II (Science Faculty)
INTRODUCTION TO SYSTEMS PROGRAMMING AND OPERATING SYSTEMS CONCEPTS
(2008 Pattern) (Semester - III)

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

Instructions to the candidates:-

1) ***All Questions are compulsory.***
2) ***All questions carry equal marks***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figure to the right indicate full marks.***

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

a) Define Starvation

b) Give any 4 components of the system program

c) Define Turnaround time

d) What is spooling process?

e) What is semaphores?

f) What is pthread?

g) What is ageing?

h) What is Mutual exclusion.

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

a) Explain deadlock prevention technique.

b) Explain different file attributes.

c) Explain continguous allocation method for files.

d) Explain the directory structure.

e) Explain clustered systems & handheld systems.

P.T.O.

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

a) Consider the following set of processes, with the length of CPU burst time and arrival time in miliseconds.

Process	Burst - time	Arrival time
P_1	7	0.0
P_2	4	2.0
P_3	1	4.0
P_4	4	5.0

Illustrate the execution of these processes using non pre - emptive SJF CPU scheduling algorithm. Also calculate average waiting time and average turn around time. Also draw gant chart.

b) Consider the following snapshot of a system. A system has 5 processes P_0 through P_4 and three resource types A, B, C.
Resource type 'A' has 10 instances, 'B' has 5& 'C' has 7 instances.

Process Name	Allocation	Max	Available
	ABC	ABC	ABC
P_0	010	753	332
P_1	200	322	
P_2	302	902	
P_3	211	222	
P_4	002	433	

Answer the following questions using Banker's Algorithm.

i) What is the content of Matrix Need?

ii) Is the system in a safe state?

c) Consider the following reference string. 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5 How many page fault will occur for the following algorithm with 4 free frames.

i) LRU

ii) Optimum.

d) Suppose the head of a moving head disk with 200 tracks numbered 0 to 199 is currently at track 53. If request in queue are 98, 183, 37, 122, 14, 124, 65, 67 What is total head movement to satisfy these request using following scheduling algorithm.

i) SSTF

ii) SCAN

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

a) What is process? State & explain in brief process state.

b) Explain clustered systems & handheld systems.

c) Explain compile time address load time address and execution time address.

d) Explain paging with the help of the example.

e) Explain different multi threading models.

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

a) Explain different operations performed on a directory.

b) Write a short note on resource allocation graph.

c) Explain in short the bounded buffer problem.

d) What is the optimization criteria for CPU - scheduling algorithms.

e) Explain multiprocessor systems.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3523

[Total No. of Pages : 3

[5038] - 34
M.C.A. (Science Faculty)
COMPUTER SCIENCE
Event Driven Programming (Win 32 SDK)
(2008 Pattern) (Semester - III)

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

Instructions to the candidates:-

1) ***All Questions are compulsory.***
2) ***Assume suitable data, if necessary.***
3) ***Win Main not needed.***
4) ***Figure to the right indicate full marks.***

Q1) Design the database table for Bank Information system about account and customer. The data source named "Bankdata" Write a SDK menu driven program. **[12]**

a) Display branch wise customer details.

b) Display the customer details whose balance is maximum.

c) Delete the customer whose location is "PUNE".

Q2) Write program statements using Win32 APIs for any four of the following

[4 × 5 = 20]

a) To change the color of the client area whenever Left button is clicked.

b) To create a metafile for drawing a smiley face and displaying smiley face at the center of the client area.

c) Display the caret at the top left corner of client area and handle left and right arrow keys appropriately. Show the caret position at the center of the client area.

d) Create an Edit box and a button, on click of the button display the text entered in the edit box with the help of a message box.

e) Display Horizontal scrollbar and handle thumb event.

P.T.O.

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

a) Write any two GDI drawing function.

b) What is the sequence of the message generated when the user presses shift 'A'?

c) Which are the different window resources?

d) On the click of Left button, from where will you extract the coordinates?

e) List the different mouse messages generated in client area.

f) How does WinProc known whether character data is 8 bit ANSI or 16 bit Unicode?

g) Write a case section where you will get a confirmation from the user before terminating the program?

h) What are the contents of wPararn and iParam for mouse messages?

i) How to associate a DlgProc to a Dialog box?

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

a) Time massage are not asynchronous.

b) WM TIMER is a queued message?

c) The InvalidateRect function removes a rectangle to the windows region.

d) After calling create caret, there is no need to call show caret.

e) Modeless dialog boxes are created using CreateDialogBox.

f) Notepad is not a example of SDI application?

g) The code for dynamically linked function does not appear in your program's .EXE file.

Q5) Attempt any four **[4 × 5 = 20]**

a) What is Thread? Explain critical section.

b) Write a Note on Device Context.

c) Write Note on WM_TIMER

d) What is MDI? Explain elements of MDI.

e) Write a difference between Win32 and Dos.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3524

[Total No. of Pages : 3

[5038] - 41
M.C.A. (Science)
CS - 401 : Introduction To Unix and Unix Internals
(2008 Pattern) (Semester - IV)

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

Instructions to candidates:-

1) ***Figures to the right indicate full marks.***
2) ***Neat diagram must be drawn whenever necessary.***
3) ***All questions are compulsory.***
4) ***All questions carry equal marks.***
5) ***Assume suitable data, if necessary.***

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

a) Mention the two modes in which unix operating system works?

b) Give an example of any two shell commands.

c) What is "Delayed write operation"?

d) Why text and data are stored in seperate regions?

e) What is the use of brk and sbrk system calls?

f) What is mean by 'Profiling"?

g) Any two functions of clock Handler

h) What is a page fault?

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

a) Using "Mknod" system call, a directory can be created in the perfect format.

b) Process is waiting on an event wakes up only when the event takes place.

c) Signals are different interrupts.

d) To decrease the startup time of frequently executed program, kernel can mark its text region.

e) The page stealer is a kernel process that swaps out memory pages that are no longer part of working set of a process.

P.T.O.

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

a) Explain two basic primitives provided by UNIX operating system to build. Programs.

b) Write a shell script which gets executed at the moment the user logs in. It should display the message. Good morning / Good Afternoon/good evening depending upon the time at which the time user logs in.

c) Explain the Architecture of unix file system.

d) Explain advantages and disadvantages of buffer cache.

e) If a process wants to access byte offset of 377759 in a file, find block number and byte offset in the disk block. Show direct / indirect block of this offset allocated in inode with the help of a diagram.

Q4) Attempt any four **[4 × 4 = 16]**

a) Show output of following :

```
# include <fcntl.h>
main ( )
{
int fd1, fd2;
char buf1[512], buf2[512];
fd1 = open (“/etc/passwd”, O_R DONLY);
fd2 = open(“/etc/passwd”, O_R DONLY);
read (fd1, buf1, size of (buf1));
read (fd2, buf2, size of (buf2);
}
```

b) Explain behaviour of the following program.

```
# include <&cntl.h>
main ( )
{
int i, j;
char buf1[512], buf2[512];
i = open (“/etc/passwd”, ORDONLY);
j = dup (i);
read (i, buf1, size of (buf1));
read (j, buf2, size of (buf2));
close (i);
read (j, buf2, size of (buf2));
}
```

c) Write a 'C' program to illustrate the sharing of pipe by two processes.

d) Show the output

```
# include <signal.h>
main ( )
{
extern catcher;
signal (SIGINT, catcher);
kill (O, SIGINT);
catcher ( );
}
```

e) Write the output of the following :

```
main ( )
{
    int i = 0;
    for (i = 0; i < 2; i ++)
    {
    for K ( );
    print f ("\n\ am  a process at i = %d /n",i);
    }
    if (fork () ==0)
    print f("\n this is a child process");
}
```

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

a) What is an Inode? What information does it store?

b) What is a mount point? What is the content of mount table in mounting a file system.

c) What is a context of a process? Give the content of the register level context.

d) Write a note on "Page fault".

e) Explain how "|s – l|wc" command will be executed using pipe in detail.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3525

[Total No. of Pages : 2

[5038] - 42
M.C.A. (Science Faculty)
Advanced Networking & Mobile Computing
(Semester - IV) (2008 Pattern)

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

Instructions to the candidates:-

1) ***All questions are compulsary.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***

Q1) Attempt all **[8 × 2 = 16]**

a) Define the terms :

i) Cell

ii) Base station

b) What is COA?

c) Give the characteristics of WAP protocol.

d) Describe the functions of gateway GSN (GGSN) in GPRS.

e) What do you mean by soft and hard handoff.

f) What are port number ranges in transport layer.

g) What are the types of user agents?

h) Define - piconent and scatternet in bluetooth.

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

a) Write a note on UDP.

b) Discuss DNS in the internet in detail.

c) Give the elements of GSM architecture and describe their functions.

d) Explain additional messages are required in optimized mobile IP.

e) Discuss different applications of mobile IP

P.T.O.

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

a) What is cellular system? Explain advantages and disadvantages.

b) Write a note on POP3 and IMAP4.

c) Discuss different entities and terminologies in mobile IP

d) Explain advantages and disadvantages in snooping TCP.

e) Discuss different types of bridges in detail.

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

a) What is spread spectrum? Explain advantages of DSSS over FHSS.

b) Explain FTP in detail.

c) Write a note on different handover scenarios in GSM.

d) To locate the MS and to address the MS which identifiers are required explain in detail.

e) What are the features of wireless session protocol / Browsing (WSP/B).

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

a) Discuss the procedure for mobile Termination call (MTC).

b) Explain given optimizations in mobile TCP

i) Fast retransmit / fast recovery.

ii) Transaction oriented TCP.

c) Write a note on transport layer (TCP) features.

d) Which protocol is used through out WWW in application layer, explain in detial.

e) Explain path loss of radio signals with free space loss.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P3526

[Total No. of Pages : 3

[5038] - 43
M.C.A. (Science Faculty)
CS - 403 : DISTRIBUTED DATA BASE SYSTEMS
(Semester - IV) (2008 Pattern)

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

Instructions to the candidates:-

1) ***Figures to the right indicates full marks.***
2) ***Neat diagram must be drawn whenever necessary.***
3) ***All questions are compulsory.***

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

a) Explain complication factors in DDBMS design? (any two)

b) What are the main reasons for a query getting rejected.

c) What is nested transaction?

d) Distributed data processing uses divide and conquer method. Justify?

e) State the objective of query processing?

f) Explain shared disk multi processor system?

g) What are promises of DDBMS?

h) Explain with example the concept of serializability?

Q2) Attempt any four **[4 × 5 = 20]**

a) Compare and constrast between client - server and peer - to - peer architecture of DDBMS?

b) What are information requirements during allocation?

c) Describe optimistic concurrency control protocol?

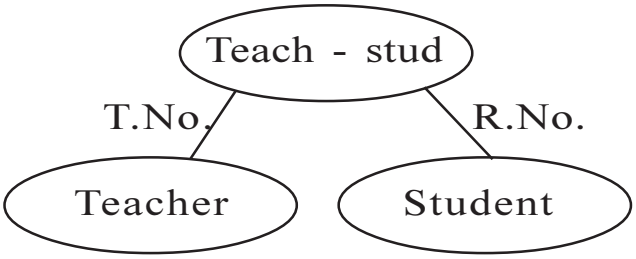
d) Explain distributed design issues?

e) Write a note : “Layers of query processing”.

P.T.O.

Q3) Attempt any four : **[4 ×6 = 24]**

a) Consider the join graph in the following diagram :



The fragmentation of the three relations is done and following table shows the number of tuples of the relation stored at three different sites S_1, S_2, S_3.

	S_1	S_2	S_3
Teacher	–	200	–
Student	600	800	700
Teach - Stud	1000	2000	–

Apply algorithm of distributed INGRES for broad cast network so that communication time is minimized?

b) Consider a query that refers to join of relations project (Projno, projname, projbudget) and Emproj (Projno, empno, empresp) on attribute projno.

Assume that project and Empproj reside at two different sites and index is on projno.

Consider Size (Project) = 200 and

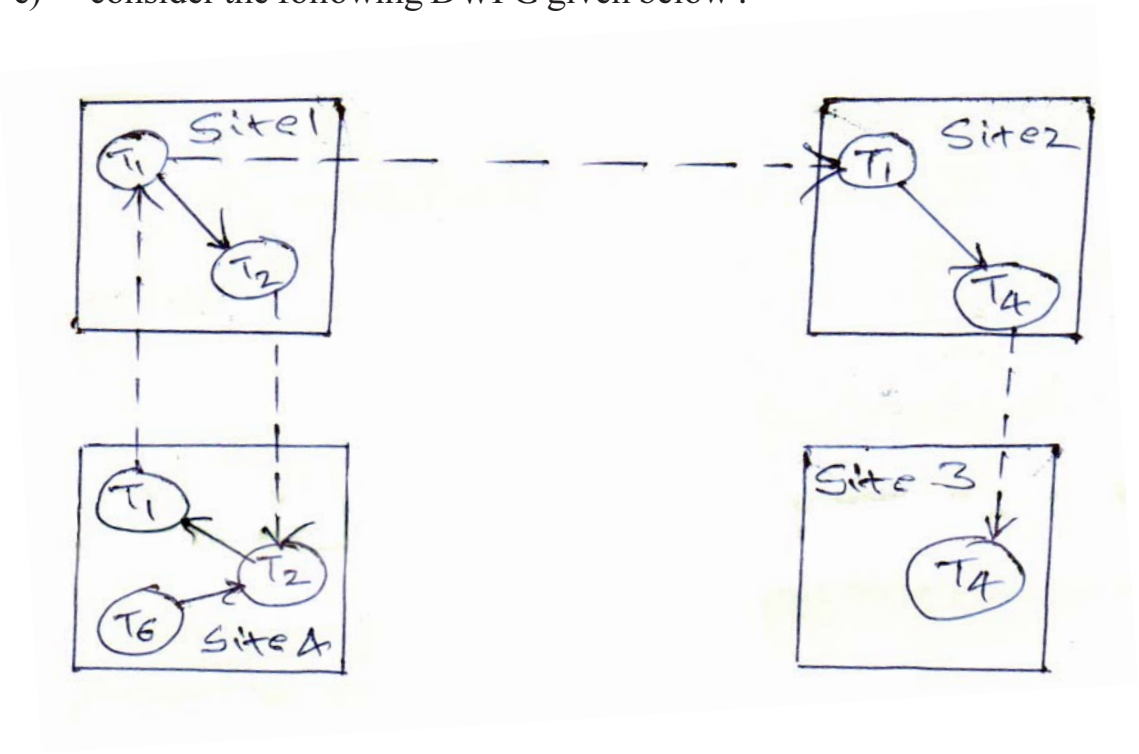
Size (Emp proj) = 300.

Write down all possible execution strategies along with cost incurred, if distributed system Realgorithm (R*) is implementd?

c) Consider the following query and transform it into optimized operator tree, select salary, empname from emp, proj, asg, pay where emp. eno = asg.eno and emp. title = pay. title and asg.pno = proj.pno and (budget > 2,50,000 or duration <36)?

d) Discuss various architectural aspects of distributed transactions?

e) consider the following DWFG given below :



Detect the deadlock and state which transactions is the part of cycle and which transactions are dead locked.

Q4) Attempt any four : **[4 × 5 = 20]**

a) Explain out - of - place update recovery information?

b) Explain distributed reliability protocol?

c) How the correctness rules can be applied to primary and derived horizontal fragmentation?

d) List out all the characteristics of query processor and explain any one in detail?

e) Write the basic fault tolerance approaches and techniques?

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P3527

[Total No. of Pages : 2

[5038] - 44
M.C.A. - II (Under Science Faculty)
CS - 405 : Object Oriented Software Engineering
(Semester - IV) (2008 Pattern) (New)

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

Instructions to the candidates:-

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Neat diagram must be drawn wherever necessary.***

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

a) What is an object orientation?

b) Define an actor

c) Specify types of testing

d) What are components and nodes in deployment diagram?

e) What is meant by package?

f) What is domain model?

g) Explain in brief function / data methods

h) What is forward Engineering?

Q2) Attempt any four of the following : **[4 × 8 = 32]**

a) A system is to be designed for a travel company for computerizing their booking. They have coaches running on different routes, each has a start and destination and several stop overs. A customer booking can be done from any stop to any other stop in a group or as in individual and charges are according to route.

Company has offices in every city where booking clerk handles the cash. Customer can check availability and also cancel booking get appropriate refund according to rules. Model system using UML techniques and draw following diagrams by giving supporting specifications if required.

i) Draw activity diagram.

ii) Draw sequence diagram.

P.T.O.

b) A music player has ON/OFF, STOP/EJECT, PLAY/REWIND and FAST/ FORWARD buttons, first two buttons allows toggling between two states. Draw state chart diagram.

c) Draw usecase diagram for bus reservation system.

d) Prepare an object and state transition diagrams for priority queues or heaps (Kind of binary trees with each subtree having a balanced state with heaviest element at the top) storing numbers, where in the operations of the shift up and shift down are possible.

e) Draw a class diagram and use case diagram for hospital management system.

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

a) Write a note on generic components of UML.

b) Discuss inheritance and its types and polymorphism.

c) Explain different up phases in detail

d) Write a note on resource management component.

e) Explain architecture of UML in detail.

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

a) Discuss importance and principles of object oriented modeling.

b) Draw component and deployment diagram for E - mail system.

c) Explain categories of requirements in object oriented Analysis (OOA)

d) What do you mean by iterative development? Discuss benefits.

e) Write a note on black box testing (BBT) and white box testing (WBT)

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3528

[Total No. of Pages : 2

[5038] - 51
M.C.A. (Science Faculty)
CS - 501 : Cryptography and Network Security
(Semester - V) (2008 Pattern)

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

Instructions to the candidates:-

1) ***All questions are compulsary.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicates full marks.***

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

a) State the different aspects those are taken care by a good security policy.

b) Why publicity attacks occur?

c) What is dictionary attack?

d) Draw a block diagram of double DES encryption.

e) Give the steps of output transformation of IDEA.

f) Using simple Columnar transposition technique construct the cipher text of the following plain text. Assume number of columns = 6 and the order of columns is 4, 3, 2, 5, 6, 1

"UNIVERSITY OF PUNE LEADING UNIVERSITY"

g) Consider the following plain Text "UNIVERSITY OF PUNE MEANS BEST EDUCATION". The key to encrypt the text is an alphabet 4 places down the line using caeser cipher construct cipher text.

h) What is Firewall? What are its benefits?

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

a) Justify – "Interpretation causes loss of message confidentiality".

b) What is Steganography? What are the uses of Steganography?

c) Explain the function 'F' of Blowfish algorithm.

d) Discuss details of one round in IDEA.

e) Give the details of sub - key generation process of RC5.

P.T.O.

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

a) What are packet filters? State advantages and disadvantages of packet filters.

b) Write a short note on Challenge/Response Token.

c) Explain the concept of Introducer trust and Certificate trust in PGP.

d) Write a short note on ESP Transport mode.

e) Write a short note on Offline certificate revocation status checks.

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

a) Explain Screened Subnet Architecture of Firewall.

b) What is Replay attack? Explain how message digest of passwords scheme suffers from replay attacks?

c) Compare SET versus SSL.

d) Justify - Birthday attack is used to detect collisions in message digest algorithms.

e) What are the strengths of IP sec? Which services are offered by IPsec?

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

a) Consider the plain text.

"DOG" 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 "UNIVERISTY OF PUNE" One time pad is QACDZMOUXGIJNVBP. Using Vernam Cipher construct the cipher text.

c) Apply play fair technique and convert the following plain text into cipher text. Plain text : MCA SEMESTER FIVE. Key word = "PLAY FARE EXAMPLE"

d) Consider the values of n = 11 and g = 13. Apply Diffie - Hellman Algorithm and generate keys K_1 and K_2 consider $x = 3$, $y = 6$.

e) Consider the plain text "10". Let P = 5 and Q = 7. Construct the cipher text using RSA algorithm and also decrypt the cipher text you have constructed to get the original plain text.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3529

[Total No. of Pages : 2

[5038] - 52
M.C.A. - III (Science Faculty)
Internet Programming Using PHP
(Semester - V) (2008 Pattern)

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

Instructions to the candidates:-

1) ***All questions are compulsary.***
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 difference between 'exit' & 'die' construct?

b) Give any two functions of approximate string equality.

c) Explain two different ways of accessing global variables.

d) What is identity operator? Explain with an example.

e) What is JSON?

f) What is the synonym of 'sizeof' function? Explain its use in PHP.

g) Explain the parse_URL function.

h) What is PHPSESSID?

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

a) What are anonymus functions? What is the other name with which they are identifies? How to declare them & use them?

b) Explain any two string decomposing function in detail alongwith examples.

c) Describe all the functions for changing character case.

d) Explain the function array_splice with all possibilities.

e) Write a php script to accept principal amount, No.of years & rate of interest and find amount using self processing form.

P.T.O.

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

a) Explain the function substring_replace with all possibilities.

b) What are iterator functions? Explain any three of them in detail.

c) Write php script to accept employee details on first page, employee salary details on second page & display salary slip on third page.

d) Write php script to find intersection, set difference & union of two arrays

e) Write a php script to create a base class cat, derive the classes lion & tiger from it & then apply introspection builtin construct to find methods and properties of both.

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

a) Explain functions used for handling stacks & queues using arrays inPHP.

b) Write a php script, to accept a string from the user and check whether it is a palindrome or not. Use the concept of sticky form.

c) Write functions for copying, renaming & deleting files. What is the difference between filectime & filemtime?

d) Write a note on PHP's object-oriented mechanism for working with directories.

e) Write note on XML document structure.

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

a) What is serialization? Explain the explicit & implicit functions used for it.

b) Explain $_FILES array with all its elements.

c) List any two functions for printing entire files in detail.

d) Write a php script to read directory name and extension of files from the user. Display the files with specified extension from that directory.

e) What is MIME? Also brief about multipart MIME.

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3530

[Total No. of Pages : 2

[5038] - 53
M.C.A. (Under Science Faculty)
COMPUTER SCIENCE
Design Pattern
(Semester - V) (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 indicates full marks.***

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

a) What are the elements of design pattern?

b) Define pipe and filter architectural pattern.

c) Give intent of stratergy Design pattern.

d) Define

   i) GOF

   ii) Pattern.

e) State collaboration of a prototype design pattern.

f) What makes design pattern?

g) Explain an Idioms.

h) What is intent of a decorator design pattern?

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

a) Define term pattern .How patterns are categorised?

b) Illustrate steps to describe a refinement approach for layered architectural pattern.

c) Discuss blackboard architectural pattern in details.

d) What are consequences of model view controller architectural pattern?

e) What are benfits and liabilities of broker architectural pattern?

P.T.O.

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

a) Explain how to organize the catlog.

b) What are the benefits of prototype design pattern?

c) Explain singletone design pattern in detail.

d) When we can use abstract factory design pattern?

e) Explain techniques for implementing the abstract factory pattern.

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

a) What is the difference between creational pattern and structural pattern?

b) Explain consequence of abstract factory design pattern.

c) Explain intent,structure and participants of decorator design pattern.

d) State and explain consequence of command design pattern.

e) Give the structure and participants of adapter design pattern.

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

a) Write a short note on counted pointer idioms.

b) With the help of structure and implemetion issues explain stratergy design pattern.

c) Explain observer design pattern with the help of structure and participants.

d) Explain intent , benefits and liabilities of command design pattern.

e) What do you mean by Intended control flow style guide idiom?

♦♦♦♦

Total No. of Questions : 5]

SEAT No. :

P3531

[Total No. of Pages : 2

[5038] - 54
M.C.A.
COMPUTER SCIENCE
CS - 505 : Software Testing & Quality Assurance
(Semester - V) (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) Define Drivers.

b) What is loop testing?

c) Explain Beta testing?

d) What is Security testing?

e) Define formal technical reviews.

f) Explain Different types of measures in software matrices.

g) What is Software Build?

h) What is goal of Quality Assurance?

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

a) Write note on real - time system testing.

b) Explain Run charts with example.

c) Explain Equivalence Partitioning in detail.

d) Define fault and error.

e) Differentiate between top - down and bottom - up approaches of Integration testing.

P.T.O.

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

a) Explain Branch coverage criteria in White box testing.

b) What is validation testing?

c) Give measures of software reliability and Availability.

d) Write steps for cause - effect diagram.

e) Explain System testing.

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

a) What is Graph Based testing method?

b) Discuss different SQA activities.

c) Explain Complexity Matrices.

d) What are the attributes of a good test?

e) What is condition testing? How different types of conditions are tested?

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

Write a short notes on

a) Regression testing.

b) Apachejmeter.

c) ISO 9000 Quality Standards.

d) Cyclomatic Complexity

e) Software safety.

♦♦♦♦