Total No. of Questions : 8]

SEAT No. :

**P3533**

[Total No. of Pages : 3

# [5038] - 102

## M.C.A. (Science Faculty) (Semester - I)

## COMPUTER SCIENCE

### CA-102 : Database Management System

### (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five questions.***
2) ***Figures to the right indicate full marks.***
3) ***Assume appropriate data if necessary.***
4) ***All questions carry equal marks.***

***Q1)*** Attempt **each** of the following:

a) Explain the Functions and responsibilities of a DBA. **[4]**

b) Explain structure of a DBMS. **[4]**

c) Define : Candidate key, Null value. **[2]**

***Q2)*** Attempt **each** of the following:

a) What is lossless join decomposition? Explain with suitable example. **[4]**

b) With the following FD's compute $(BCD)^+$. **[4]**
A->BC, CD->E, E->C, D->AEH, ABH->BD, DH->BC

c) State the properties of transaction. **[2]**

***Q3)*** Attempt **each** of the following:

a) Consider the following relation schema:
Emp(eno, ename, address, dno)
Dept(dno, dname)
Emp_dependents(dep_name, relation, age, eno)
Emp and Dept related m-1
Emp and Emp_dependents related 1-m
Solve following query using **relational algebra**:

i) List the names of dependents for employee "ABC". **[2]**

ii) List the names of the employees for dno = 7, who does not have any dependents. **[2]**

***P.T.O.***

b) Consider the following transactions.

| T1 | T2 | T3 |
|---|---|---|
| Read(X) | Read(X) | Read(Z) |
| Read(Y) | Read(Z) | Read(Y) |
| Y=Y-X | X=X+Z | Y=Y+Z |
| Write(Y) | Write(X) | Write(Y) |

Give any 2 non-serial schedules that are serializable. **[4]**

c) When the relation is said to be in 3NF? **[2]**

***Q4)*** Attempt **each** of the following:

a) Discuss set membership and range specifier operators in SQL. **[4]**

b) Explain Armstrong's axioms required to compute $F^+$. **[4]**

c) What is Query Language? State any two categories of it. **[2]**

***Q5)*** Attempt **each** of the following:

a) Explain the concept of Multiple-Granularity locking. **[4]**

b) State and explain Thomas' Write Rule. **[4]**

c) State the different types of users in a DBMS. **[2]**

***Q6)*** Attempt **each** of the following:

a) Every cascadeless schedule is also recoverable. Comment. **[4]**

b) What are the benefits of strict two-phase locking? What are the disadvantages? **[4]**

c) What is lock? Explain types of locks. **[2]**

***Q7)*** Attempt **each** of the following:

a) What is RAID? Explain different levels of RAID. **[5]**

b) Since every conflict-serializable schedule is view-serializable, then why do we emphasize conflict serializability rather than view-serializability? Explain with suitable example. **[5]**

***Q8)*** Attempt **<u>each</u>** of the following:

a) Consider the following relations. **[5]**

Game (Gno, gname, no_of_players, coach_name, captain_)

Player (Pno, pname)

Country and Population are related with many-to-many relationship.

Create a RDB for above and solve the following queries:

i) List the names of players playing Cricket and Hockey.

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

iii) List the name of players playing Basketball.

b) The log corresponding to a particular schedule for four transactions T1, T2, T3, T4 is as follows: **[5]**

[Start, T1]

[Read, T1, D]

[Write, T1,D,20]

[Commit, T1]

[Checkpoint]

[Start, T4]

[Write, T4, B,15]

[Write T4, A, 20]

[Commit, T4]

[Start, T2]

[Read, T2,B]

[Write, T2, B, ,12]

[Start, T3]

[Write,T3,A,20]

[Read,T2,D]

[Write,T2,D,25] System crash

If **deffered update** with checkpoint is used, what will be the recovery procedure?

Total No. of Questions : 8]

SEAT No. :

**P3534**

[Total No. of Pages : 3

# [5038] - 103

## M.C.A.-I (Under Science Faculty) (Semester - I)

## COMPUTER SCIENCE

## CA-103 : Mathematical Foundations

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Solve any five questions out of eight questions.***
2) ***Figures to the right indicate full marks.***
3) ***Use of non-programmable scientific calculator is allowed.***

***Q1)*** Attempt each of the following:

a) Let A, B and C be sets. Show that $(A-B)-C=(A-C)-(B-C)$. **[4]**

b) Let A, B and C be finite sets then show that **[4]**

$$|A\cup B\cup C|=|A|+|B|+|C|-|A\cap B|-|A\cap C|-|B\cap C|+|A\cap B\cap C|.$$

c) Give an example of reflexive relation but not symmetric. **[2]**

***Q2)*** Attempt each of the following:

a) Let $f:R\to R$, $f(x)=3x-1$ and $g:R\to R$, $g(x)=\cos x$. Find $(fog)(x)$ and $(gof)(x)$. **[4]**

b) Let $A=\{x\in R^{+}\mid x<5\}$ and $B=\{x\in R\mid (x-2)(x+1)(x-7)=0\}$. Find A x B. **[4]**

c) Let A = {1, 2, 3, 4, 12}. Consider the partial order of divisibility on A. That is, if $a$ and $b\in A$, $a\le b$ if and only if $a|b$. Draw the Hasse diagram of the poset $(A,\le)$. **[2]**

***P.T.O.***

***Q3)*** Attempt each of the following:

a) Compute the truth table of the statement $(p \Rightarrow q) \Leftrightarrow (\sim q \Rightarrow \sim p)$. **[4]**

b) Write the following statements in terms of $p$, $q$, $r$ and logical connectives. **[4]**

i) Either $4 > 1$ or $4 < 5$.

ii) If $3 \leq 3$ then $2 > 2$.

iii) It is not the case that $2 > 2$ or $4 > 1$.

c) Give the negation of each of the following statements. **[2]**

i) It will rain tomorrow or it will show tomorrow.

ii) If you drive, then I will walk.

***Q4)*** Attempt each of the following:

a) Prove that is no rational number $p/q$ whose square is 2. **[4]**

b) Show that $\forall x \mathrm{P}(x) \vee \forall x \mathrm{Q}(x)$ and $\forall x(\mathrm{P}(x) \vee \mathrm{Q}(x))$ are not logically equivalent. **[4]**

c) If the universe of discourse is $\{1, 3\}$ and $\mathrm{P}(x): x = 1$ and $\mathrm{Q}(x): x = 3$, find the truth value of $(x)(\mathrm{P}(x) \vee \mathrm{Q}(x))$. **[2]**

***Q5)*** Attempt each of the following:

a) Find G.C.D. of polynomials $f(x) = x^6 + x^3 + x + 1$ and $g(x) = x^2 + 1$. **[4]**

b) Find all roots of $8x^3 - 36x^2 + 46x - 15 = 0$ the roots are in arithmetic progression. **[4]**

c) Use Remainder Theorem to find remainder when $x^4 - 3x^3 - 7x^2 - 2$ is divided by $x - 3$. **[2]**

***Q6)*** Attempt each of the following:

a) Show that 19 is not divisor of $4n^2 + 4$ for any integer. **[4]**

b) Find the remainder of $8^{401}$, when divided by 13. **[4]**

c) If P is prime and $a^2 \equiv b^2 \pmod{P}$ then show that either $P|(a+b)$ or $P|a-b$. **[2]**

***Q7)*** Attempt each of the following:

a) Let $\sigma = (1, 5, 2)(1, 3)$, $T = (6, 1, 9, 7)$. Compute $\sigma T \sigma^{-1}$. **[5]**

b) Find GCD of 3997 and 2947 and express it in the form $d = 3997\,m + 2947\,n$ for some $m, n \in z$. **[5]**

***Q8)*** Attempt each of the following:

a) Solve the following system of equations by Guass - elimination method. **[5]**

$$2x - y + 3z = 0$$
$$-x + 3y - z = 0$$
$$4x - y + 2z = 0$$

b) Find inverse of the matrix **[5]**

$$A = \begin{bmatrix} 2 & 4 & 2 \\ -1 & 0 & 2 \\ 1 & 1 & -3 \end{bmatrix}$$ by adjoint method.

Total No. of Questions : 8]

SEAT No. :

**P3535**

[Total No. of Pages : 4

# [5038] - 104

## M.C.A. (Science Faculty) (Semester - I)

## CA-104 : Concrete Mathematics and Graph Theory

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

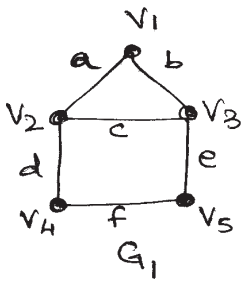
***Instructions to the candidates:***

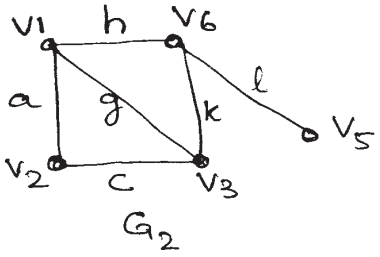
1) *Attempt any five questions out of eight.*
2) *All questions carry equal marks.*
3) *Figures to the right indicates full marks.*
4) *Use of single memory, non-programmable scientific calculator is allowed.*

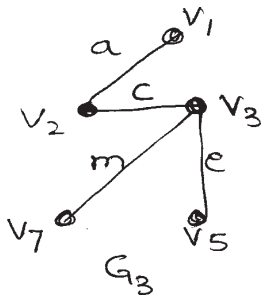
***Q1)*** Attempt each of the following:

a) What are the last two digits in the decimal representation of $3^{400}$. **[4]**

b) For the graph $G_1$, $G_2$, $G_3$ given below, find $G_2 \oplus (G_1 \cap G_3)$. **[4]**



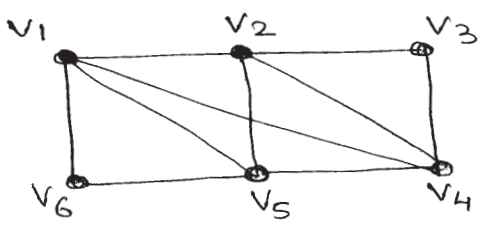




c) Give an example of graph which is complete bipartite and regular. **[2]**

***Q2)*** Attempt each of the following:

a) Use Fleury's algorithm, to find Euler Tour in the following connected graph. **[4]**

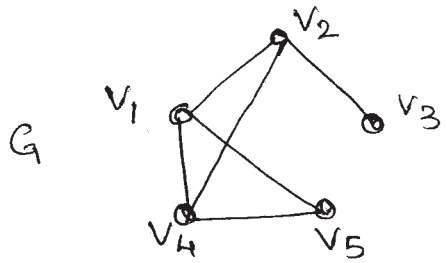



***P.T.O.***

b) Draw the following graph from adjacency matrix and find complement of its underlying graph. **[4]**

$$\begin{bmatrix} 2 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 1 & 2 & 0 \end{bmatrix}.$$

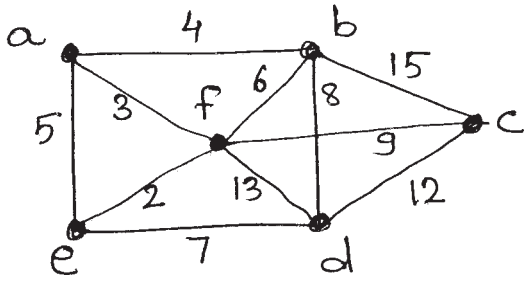
c) Fuse the vertices $V_3$ and $V_5$ of the following graph G and hence find centre of the resultant graph. **[2]**




***Q3)*** Attempt each of the following:

a) Enerypt the message "DO NOT PASS GO', by using Linear Cipher $f(x) \equiv 3x + 7 \pmod{26}$. **[4]**

b) Using Prim's algorithm, find shortest spanning tree of following graph. **[4]**




c) prove that integers 361 and 420 are relatively prime to each other. **[2]**

***Q4)*** Attempt each of the following:

a) Find all solutions in integers $x$ to linear congruence $15x \equiv 12 \pmod{57}$. **[4]**

b) Solve the recurrence relation $2a_r = 7a_{r-1} - 3a_{r-2}$, $a_0 = 1 = a_1$. **[4]**

c) Write definitions of **[2]**

i) Planar Graph.

ii) Balanced Diagraph.

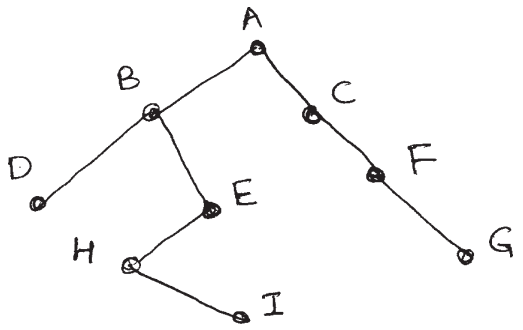
***Q5)*** Attempt each of the following:

a) Draw arborescence for the following expression and express it in the polish notation. **[4]**

$$\frac{a * b}{c - \frac{d^4}{3} + e} + f$$

b) Solve the recurrence relation $a_{r+2} + 2a_{r+1} + a_r = g(2^r), a_0 = 2, a_1 = 4$. **[4]**

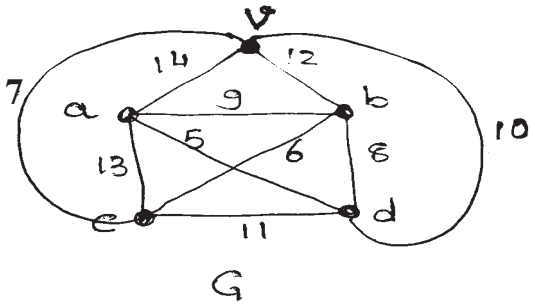
c) Obtain preorder and postorder traversal for the following binary tree. **[2]**




***Q6)*** Attempt each of the following:

a) State and prove Euler's formula for Planar graph. **[4]**

b) Solve the following travelling salesman problem for a sales person based at *v* in the graph. **[4]**

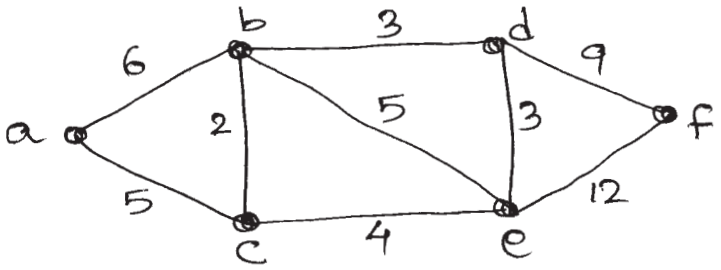



c) Draw the graph which is Eulerian but not Hamiltonian. **[2]**

***Q7)*** Attempt each of the following:

a) Find all integers $x$ which leave a remainder of 1, 2, 3 and 4 when divided by 5, 7, 9 and 11 respectively. **[5]**

b) Using Dijkstras algorithm, find the shortest path from vertex '*a*' to all vertices of graph. **[5]**

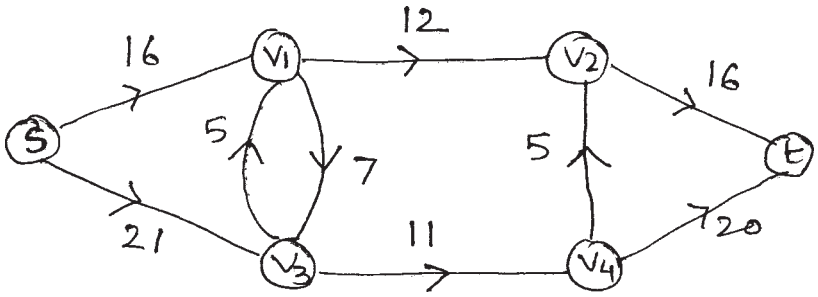



***Q8)*** Attempt each of the following:

a) What is the ciphertext that is produced when RSA encryption with public key $(e, n) = (3,2669)$ is used to encrypt the message BESTWISHES?

Use the protocol A = 00, B = 01, ...., Z = 25 and break your message up into blocks of length 4. **[5]**

b) Determine the maximal flow in the given network, from source *s* to sinkt. **[5]**



Total No. of Questions : 8]

SEAT No. :

P3536

[Total No. of Pages : 2

# [5038] - 105

## M.C.A. (Under Science Faculty) (Semester - I)

## CA105 : COMPUTER ORGANIZATIONS

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five questions from eight.***
2) ***All questions carry equal marks.***
3) ***Figures to the right side indicate full marks.***

***Q1)*** a) Explain typical microcomputer organization. Explain functions of blocks. **[4]**

b) What is Decoder? Draw logic diagram for 3 to 8-line decoder and explain its working with truth table. **[4]**

c) What is relation between number of inputs and number of address lines in multiplexer? How many address lines required for 4 : 1 MUX? **[2]**

***Q2)*** a) What is the need of Interrupt Vector Table? How does processor handle multiple interrupts? **[4]**

b) Explain the concept of Stack. Which are the instructions and registers related with Load and Unload of data? **[4]**

c) Implement NOT and AND gate using NAND gates only. **[2]**

***Q3)*** a) What are functions of ALU? Explain action of Fetch instruction. **[4]**

b) What is counter? Explain 3 bit asynchronous up counter using logic diagram. **[4]**

c) State the features of USB. **[2]**

***P.T.O.***

***Q4)*** a) Explain the function of CPU in microcomputer system. **[4]**

b) What is purpose of parallel processing? Give one example. **[4]**

c) Draw logic diagram of RS latch using NAND gate and give its truth table. **[2]**

***Q5)*** a) What is shift register? Explain different types of shift register on the basis of input and output. **[4]**

b) State and prove De-Morgan's theorem. **[4]**

c) What is mean by MBR and MAR? **[2]**

***Q6)*** a) Define half adder and full adder. Explain working of half adder with its logic diagram. **[4]**

b) Explain concept of Numeric co-processor with help of neat block diagram. **[4]**

c) What are tri-state devices? **[2]**

***Q7)*** a) Draw circuit diagram of 4-bit R-2R ladder network DAC and explain its working. **[5]**

b) What is need of cache? Explain direct mapping technique of cache memory with main memory. **[5]**

***Q8)*** a) Using K-map simplifies following expression and draw simplified logic diagram.

F (A, B, C, D) = A'BCD + ABC'D + ABCD + A'B'CD. **[5]**

b) What are features of CISC architecture? **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3537**

[Total No. of Pages : 4

# [5038] - 201

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

## COMPUTER SCIENCE

### CA 201 : Data Structures

### (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five questions out of 8.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

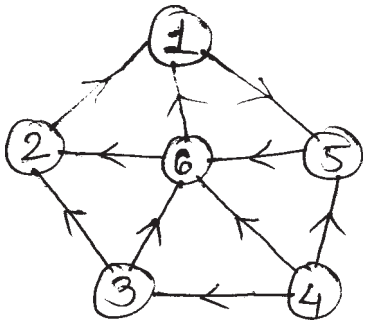
***Q1)*** Attempt all of the following:

a) Define the following terms with an example. **[4]**

i) Full binary tree.

ii) Balance factor.

b) Write the adjacency matrix and adjacency list of the following graph. **[4]**




c) What is Data Structure? **[2]**

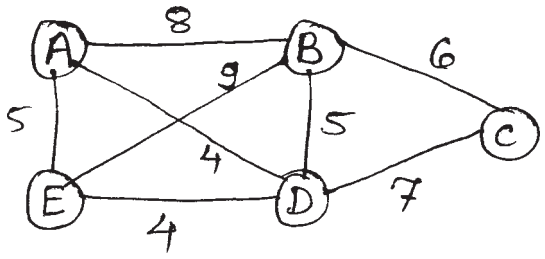
***P.T.O.***

***Q2)*** Attempt all of the following:

a) Construct a Binary Search Tree for the following data & traverse the constructed binary search tree using preorder and postorder traversal.

30, 57, 31, 20, 55, 7, 25 **[4]**

b) Using Prim's algorithm find the minimum cost spanning tree. **[4]**




c) Define time complexity. Also calculate the time complexity of the following code: **[2]**

```
for i = 1 to n do
    for j = 1 to i do
    x = x + 1
```

***Q3)*** Attempt all of the following:

a) What is Generalized linked list? Draw generalized linked list for following list. **[4]**

$L = ((10, 20), (), 30, ())$.

b) In the following sequence a letter means push that letter on the stack and '*' means pop a letter from stack. Write the letter resulting from each pop operation. Show stack contents for each operation.

LAST *** IN *** FIRST *** OUT *** STACK ***. **[4]**

c) Calculate the address of element a[2][1] in a character array a[3] [4] in the row major representation. (Assume base address = 1000) **[2]**

***Q4)*** Attempt all of the following:

a) Sort the following data using insertion sort. **[4]**

12, 5, 3, 10, 7. Also write time complexity of insertion sort (Best case).

b) Write a C function to display circular singly linked list. **[4]**

c) Write applications of stack. **[2]**

***Q5)*** Attempt all of the following:

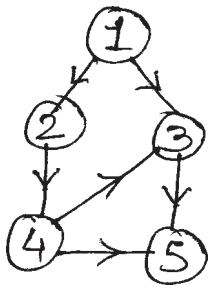
a) Write a recursive binary search function to search a number into an array of integers. **[4]**

b) Write a C function to delete an element at particular position in Doubly Linked list. **[4]**

c) Define multiple queues. **[2]**

***Q6)*** Attempt all of the following:

a) Consider the following graph. Traverse the graph in DFS. Also show the steps, consider 1 as a starting vertex. **[4]**



b) Convert the given infix expression to postfix expression. Show the stack contents for each step.

(A + B) * C – E/F **[4]**

c) Differentiate between Linear Search and Binary Search. **[2]**

***Q7)*** Attempt all of the following:

a) Sort the following data using Heap Sort method. **[5]**

30, 70, 25, 80, 35, 40, 60

b) List out various hash functions. Explain any two in detail. **[5]**

***Q8)*** Attempt all of the following:

a) Write a C functions to count non leaf nodes and total nodes of a binary tree. **[5]**

b) Write a C functions to insert and delete an element from circular static queue. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3538**

[Total No. of Pages : 4

# [5038] - 202

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

## CA 202 : Theoretical Computer Science

## (2013 Pattern)

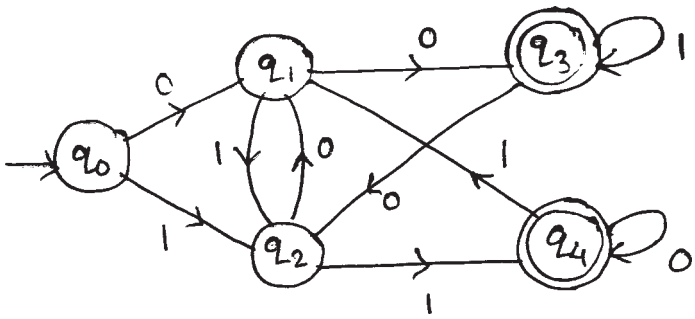
*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) *Attempt any 5 out of 8 questions.*
2) *All questions carry equal marks.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*

***Q1)*** Attempt the following:

a) Construct Regular Grammar for the following DFA. **[4]**




b) Construct Turing machine for $L=\{a^n b^n c^{n+1} / n \geq 0\}$. **[4]**

c) Describe in English and construct NFA for regular expression a (a + b)* a (a + b)*. **[2]**

***Q2)*** Attempt the following:

a) Construct DFA for all strings over {0, 1} that starts and ends with the same symbol. **[4]**

***P.T.O.***

b) Rewrite the following grammar by eliminating $\in$-production and unit production from the following grammar. **[4]**

$S \rightarrow ABA$

$A \rightarrow aA / \in$

$B \rightarrow bB / \in$

c) Define and give example of any two operations on sets. **[2]**

***Q3)*** Attempt the following:

a) Construct Moore machine over {0, 1} to remember the last symbol read. Gives output 'Y' if the current input matches the previous one otherwise output 'N'. **[4]**

b) Convert the following grammar into CNF. **[4]**

$S \rightarrow 0A/1B$

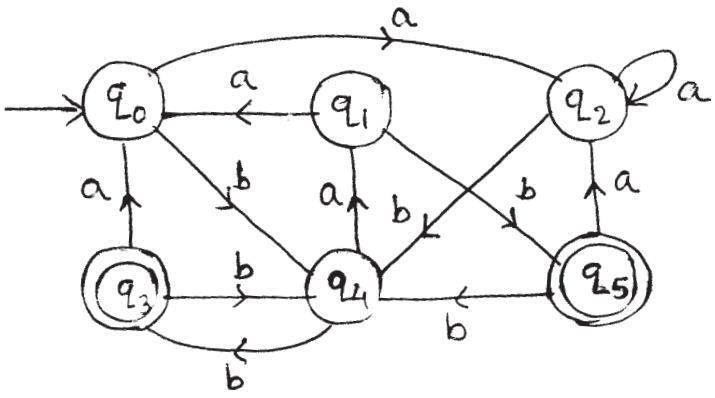
$A \rightarrow 0A1B/1A0B/1$

$B \rightarrow 01B/10B/0$

c) Explain any two types of the Turing Machine. **[2]**

***Q4)*** Attempt the following:

a) Minimize the following DFA. **[4]**



b) Check whether $L=\{a^n b^n c^{n+1} / n \geq 0\}$. is context-free. Justify your answer. **[4]**

c) Let R = { (1, 2), (2, 2), (2, 3) }. Find **[2]**

i) Transitive closure and

ii) Reflexive and Transitive Closure of R.

***Q5)*** Attempt the following:

a) Construct PDA for $L=\{a^n b^m c^n / n,m \geq 1\}$. **[4]**

b) Convert the following grammar into GNF. **[4]**

$S \rightarrow AB$
$A \rightarrow BS/0$
$B \rightarrow A1/1$

c) Define Proper Prefix and Proper Suffix with examples. **[2]**

***Q6)*** Attempt the following:

a) Construct PDA for the following CFG. **[4]**

$S \rightarrow 0A1$
$A \rightarrow 0A1/B$
$B \rightarrow 1B/1$

b) Rewrite the following grammar by removing the useless symbols if any. **[4]**

$S \rightarrow AB/AA/CD$
$A \rightarrow aAa/bAB/\in$
$B \rightarrow aBb/bBa$
$C \rightarrow aC/aB$

c) Differentiate between Moore machine and Mealy machine. **[2]**

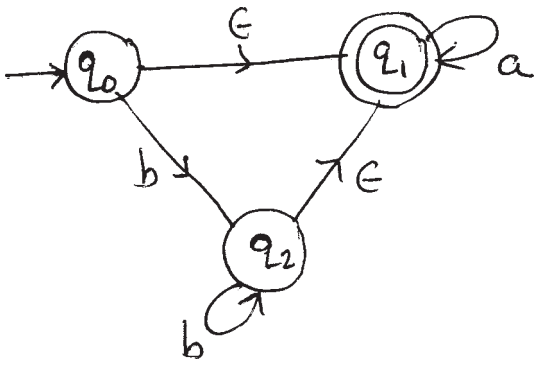
***Q7)*** Attempt the following:

a) Construct CFG for $L = L_1, L_2$ where **[5]**

$$L_1 = \{a^n b^m / n > m, m \geq 1\}$$

$$L_2 = \{a^n b^m / m > n, n \geq 1\}$$

b) Construct DFA equivalent to the following NFA. **[5]**




***Q8)*** Attempt the following:

a) Prove that regular sets are closed under union. **[5]**

b) Construct CFG equivalent to the following PDA **[5]**

$M = (\{q_0, q_1\}, \{a, b\}, (X, R\}, \delta, q_0, R, \phi)$

Where $\delta$ is defined as

$\delta\ (q_0, a, R) = (q_0, XR)$

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

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

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

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

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

Total No. of Questions : 8]

SEAT No. :

P3539

[Total No. of Pages : 3

# [5038] - 203

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

## CA 203 : Object Oriented Programming (C ++)

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Answer any five questions from the following.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data if necessary.***

***Q1)*** Attempt all of the following:

a) Explain the following terms: **[4]**

i) Compile time polymorphism.

ii) Multiple inheritance.

b) What is cin and cout in C++? Compare them with scanf and printf functions in C. **[4]**

c) Write any two differences between object oriented programming and procedure oriented programming. **[2]**

***Q2)*** Attempt all of the following:

a) What is an inline function? What are its limitations? **[4]**

b) Explain how dynamic binding is achieved in C++ with example? **[4]**

c) List operators which can not be overloaded with friend function. **[2]**

***P.T.O.***

***Q3)*** Attempt all of the following:

a) Write characteristics of constructors. **[4]**

b) Explain function template with multiple parameters with eg. **[4]**

c) State True/False. Justify. **[2]**

"A class containing a virtual function can not be instantiated".

***Q4)*** Attempt all of the following:

a) What are characteristics of static data members? Explain static data members with example. **[4]**

b) What are different methods to open a file in C++? Give example. **[4]**

c) Differentiate between new and malloc. **[2]**

***Q5)*** Attempt all of the following:

a) Explain with example how a reference can be returned from a function. **[4]**

b) Write a C++ program to accept person's name and age from user. Throw an exception if age entered is 0 or less than zero. **[4]**

c) What is the significance of protected access specifier. **[2]**

***Q6)*** Attempt all of the following:

a) Consider a Class Item (itemcode, name, prize) write accept and display function & store information of 'n' items. Also find the item with highest cost. **[4]**

b) Explain the concept of virtual base class with example. **[4]**

c) Trace the output of the following code segment: **[2]**

(Assume there are no syntax errors).

```
int i = 10 ;
main()
{ int i = 5;
int x = i + : : i ;
cout <<  i << : : i << x;
}
```

***Q7)*** Attempt all of the following:

a) Write a C++ program to copy contents of one file to another by removing extra spaces. **[5]**

b) Explain type conversion from basic to class type with example. **[5]**

***Q8)*** Attempt all of the following:

a) Write a C++ program to overload following operators for class matrix: **[5]**

i) <<

ii) >>

iii) = = (to compare two matrices) Write a main ( ) function to test above functions.

b) Consider a class message (char Msg [20], int len) and a class key (int k). Implement functions accept and display for each class. Also define a function to encrypt message 'Msg' with key 'k' & display it. Write main( ) function to invoke above functions. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3540**

[Total No. of Pages : 3

# [5038] - 204

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

## COMPUTER SCIENCE

## Computer Networks

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any 5 of the following.***
2) ***Neat diagram must be drawn whenever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Attempt all of the following: **[4 + 4 + 2 = 10]**

a) Define the terms:

i) Browser.

ii) Server.

iii) URL.

iv) Cookies.

b) Define protocol. What are key elements of protocol.

c) Consider a noiseless channel with a bandwidth of 4000 Hz transmitting a signal with two signal level. What will be the maximum bit rate?

***Q2)*** Attempt all of the following: **[4 + 4 + 2 = 10]**

a) What are measures of network performance.

b) Write short note on framing in data link layer.

c) List any four data representation techniques.

***P.T.O.***

***Q3)*** Attempt all of the following: **[4 + 4 + 2 = 10]**

a) Write short note on Gigabit ethernet.

b) What is controlled access? Explain polling reservation in detail.

c) Define standards. Give its types.

***Q4)*** Attempt all of the following: **[4 + 4 + 2 = 10]**

a) What is addressing? Explain its types.

b) What are design issues of layer?

c) Differentiate between IP address & port no.

***Q5)*** Attempt all of the following: **[4 + 4 + 2 = 10]**

a) Construct a CRC message for given bit stream 110010101 and generator polynomial is $x^4 + x^2 + 1$.

b) Explain structure of UDP header with diagram.

c) Find out class, net-id, host-id of IP address 128.168.1.1.

***Q6)*** Attempt all of the following: **[4 + 4 + 2 = 10]**

a) Write short note on CSMA.

b) Compare virtual circuit and datagram subnet.

c) What is full duplex Ethernet?

***Q7)*** Attempt all of the following: **[5 + 5 = 10]**

a) Write short note on simplex stop and wait protocol.

b) How network layer deals with logical addresses.

***Q8)*** Attempt all of the following: **[5 + 5 = 10]**

a) What is switching? Compare circuit switching and Packet Switching.

b) Describe all fields of TCP header with diagram.

Total No. of Questions : 8]

SEAT No. :

**P3541**

[Total No. of Pages : 3

# [5038] - 205

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

## CA-205 : Advanced Database Management System

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Answer the following:

a) Explain 2-phase commit protocol in Distributed Database. **[4]**

b) Explain architecture of Mobile Database. **[4]**

c) What is ODMG? **[2]**

***Q2)*** Answer the following:

a) Explain shared memory multiple CPU architecture. **[4]**

b) What are advantage and disadvantage of ORDBMS? **[4]**

c) What do you mean by Audit trail? **[2]**

***Q3)*** Answer the following:

a) What are characteristics of OODBMS? **[4]**

b) What are advantage and disadvantage of parallel database? **[4]**

c) What are goals of security? **[2]**

***P.T.O.***

***Q4)*** Answer the following:

a) What are different types of distributed database? **[4]**

b) What is data encryption and how it is use in database security? **[4]**

c) What is complex object? **[2]**

***Q5)*** Answer the following: **[4]**

a) Consider the following relation;

Company (Company-no, Company -address, City, Company - name, turnover)

Following is the set of simple predicates defined over company.

address = 'pune', turnover $\geq$ 2,00,000?

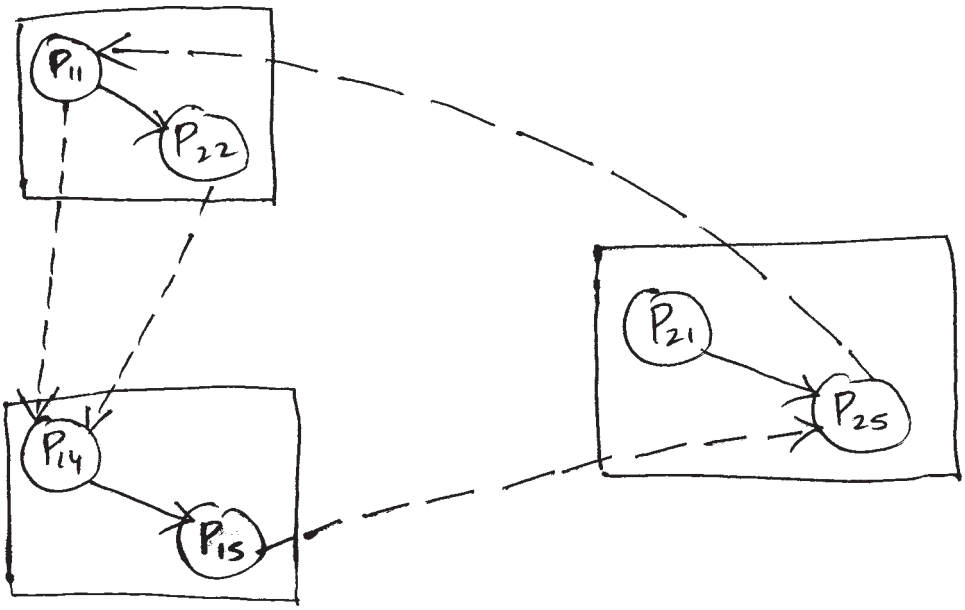
Perform Horizontal fragmentation.

b) What are relationships among objects? **[4]**

c) Name key element of parallel data-base. **[2]**

***Q6)*** Answer the following:

a)




Check if deadlock exists in system. If so, find out the sites and processes involved in deadlock. **[4]**

b) What is hash (#) partition in query parallelism. **[4]**

c) What is object? **[2]**

***Q7)*** Answer the following:

a) Explain OQL with example. **[5]**

b) Explain Data Encryption in detail. **[5]**

***Q8)*** Answer the following:

a) Write note on Multimedia Database. **[5]**

b) What are characteristics of different types of DBMS. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3542**

[Total No. of Pages : 4

# [5038] - 301

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

## CA-301 : DESIGN AND ANALYSIS OF ALGORITHMS

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***Solve any Five from the following.***

***Q1)*** Attempt all of the following:

a) Write the Horner's Rule for polynomial evaluation and its Pseudocode. **[4]**

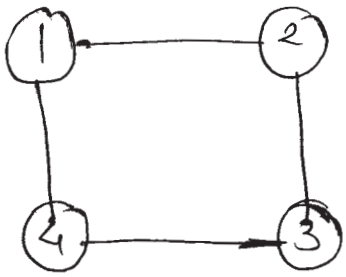
b) Solve the given instance of TSP by using branch and bound reduced cost matrix method. **[4]**

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

c) What is the O notation. **[2]**

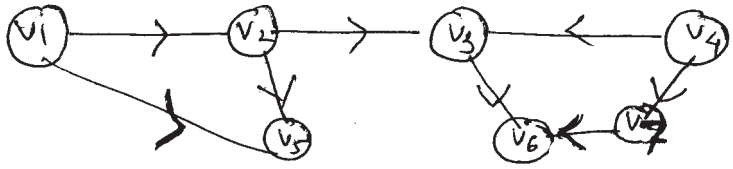
***Q2)*** Attempt all of the following:

a) For the following graph find out the all possible solutions with M = 3 colour. **[4]**




***P.T.O.***

b) Find the topological order for the following graph. **[4]**




c) Write a recursive algorithm for calculating factorial of a number. **[2]**

***Q3)*** Attempt all of the following:

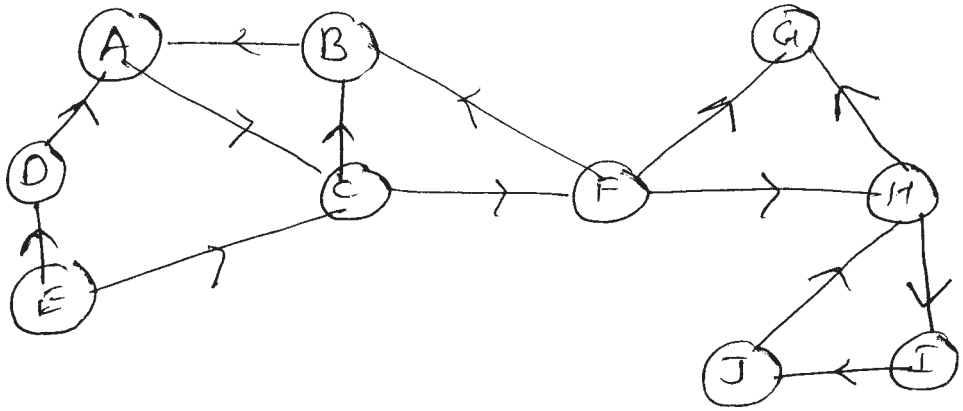
a) Determine the polynomial of smallest degree that interpolate the point (0, 1), (1, 2), (2, 3). **[4]**

b) Draw the portion of state space tree generated by LCBB for the knapsack problem instance by n = 4, p = (10, 10, 12, 18), w = ($\alpha$, 4, 6, 9) and m = 15. **[4]**

c) Define space complexity and time complexity of an Algorithm. **[2]**

***Q4)*** Attempt all of the following:

a) Find strongly connected components of given graph. **[4]**



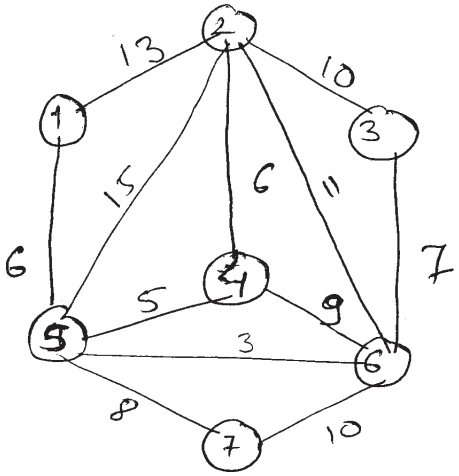

b) Explain the sum of subsets problem with its explicit and implicit constraints. **[4]**

c) Give the difference between Prim's and Kruskal algorithm. **[2]**

***Q5)*** Attempt all of the following:

a) Discuss the time complexity of merge sort algorithm in best case and worst case. **[4]**

b) Find minimum cost and minimum spanning tree for the following graph G. Using Prim's algorithm. **[4]**




c) Explain optimal storage on Tapes. **[2]**

***Q6)*** Attempt all of the following:

a) Find an optimal paranthesization of a matrix chain product whose sequence of dimensions is 5 x 10, 10 x 3, 3 x 12, 12 x 5, 5 x 50, 50 x 6 using dynamic programming. **[4]**

b) Consider the following instance for job sequencing with deadlines problem where n = 5, p (6, 3, 4, 8, 5) & d (3, 1, 4, 2, 4). Give solution obtained using greedy method that uses set representation. **[4]**

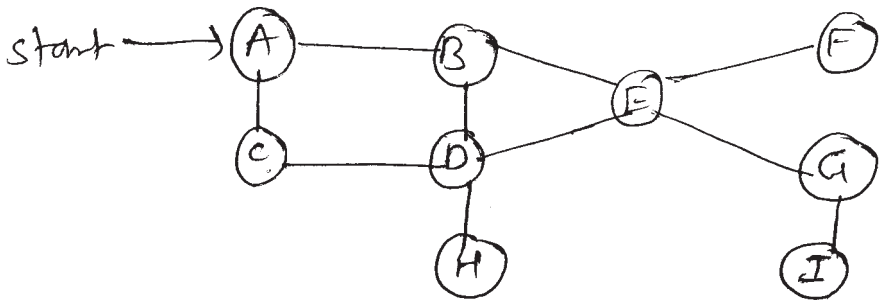
c) Define NP-Hard and NP-Complete. **[2]**

***Q7)*** Attempt all of the following:

a) Obtain the reduced cost matrix for the TSP instance defined by the cost matrix (using dynamic programming) **[5]**

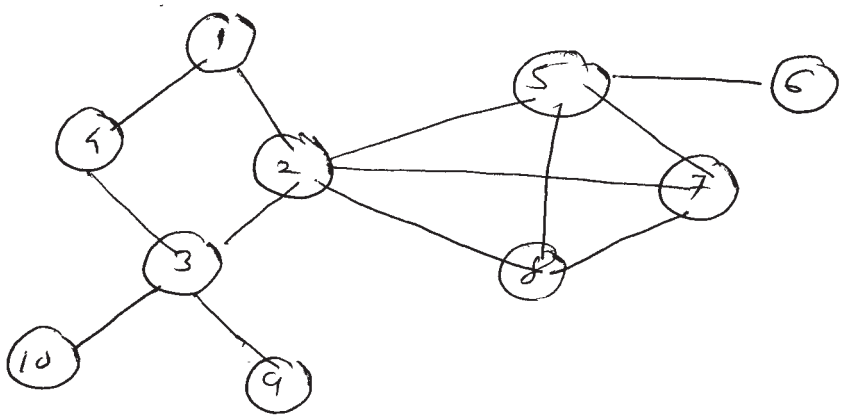
$$\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$$

b) Draw the DFS & BFS spanning tree for the following graph. **[5]**




***Q8)*** Attempt all of the following:

a) Find articulation point & Bj-connected components for the following graph G. **[5]**




b) Solve the following 011 knapsack problem using dynamic programming using function method. **[5]**

m = 6, n = 3, w = (2, 3, 4) p = (1, 2, 5)

Total No. of Questions : 8]

SEAT No. :

P3543

[Total No. of Pages : 3

# [5038] - 302

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

## CA 302 : OPERATING SYSTEM CONCEPTS

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) *Answer any five questions.*
2) *Figures to the right indicates full marks.*

***Q1)*** Answer the following:

a) Define operating system & explain any two types of it. **[4]**

b) Explain different types of file access methods. **[4]**

c) Define turn around time. **[2]**

***Q2)*** Answer the following:

a) Explain Indexed Allocation with its advantages & disadvantages. **[4]**

b) Explain the four necessary condition for the deadlock to occur. **[4]**

c) What is Thrashing? **[2]**

***Q3)*** Answer the following:

a) Explain the structure of disk. **[4]**

b) Write a note on multilevel queue scheduling. **[4]**

c) What is critical section? **[2]**

***P.T.O.***

***Q4)*** Answer the following:

a) Explain basic operations on file. **[4]**

b) Explain reader-writer problem. **[4]**

c) What is dispatch latency? **[2]**

***Q5)*** Answer the following:

a) Write a short note on critical section. **[4]**

b) Explain file protection. **[4]**

c) What is Caching? **[2]**

***Q6)*** Answer the following:

a) Draw & explain state transition diagram of process. **[4]**

b) Explain any four problems with memory management. **[4]**

c) What is Multithreading? **[2]**

***Q7)*** Answer the following:

a) Consider the following set of processes with the length of CPU burst time & arrival time in millisecond. **[5]**

| Process | Burst Time | Arrival Time |
|---|---|---|
| $P_1$ | 5 | 1 |
| $P_2$ | 3 | 0 |
| $P_3$ | 2 | 2 |
| $P_4$ | 4 | 3 |
| $P_5$ | 8 | 2 |

What is the average waiting time & average turn around time for these processes with - FCFS and preemptive SJF scheduling.

b) Consider the following snapshot of the system. **[5]**

Answer the following questions using Bankers Algorithm.

i) What is the content of need matrix?

ii) Is the system in a safe state?

| Process | Allocation | MAX | Available |
|---|---|---|---|
| | A B C D | A B C D | A B C D |
| $P_0$ | 0 6 3 2 | 0 6 5 2 | 1 5 2 0 |
| $P_1$ | 0 0 1 2 | 0 0 1 2 | |
| $P_2$ | 1 0 0 0 | 1 7 5 0 | |
| $P_3$ | 1 3 5 4 | 2 3 5 6 | |
| $P_4$ | 0 0 1 4 | 0 6 5 6 | |

***Q8)*** Answer the following:

a) Let head of moving disk with 200 tracks numbered from 0 to 199 is currently at 100. Consider the queue of requests as follows: **[5]**

23, 89, 132, 42, 187.

Compute the total head movements using

- SSTF & LOOK algorithm.

b) Consider the following reference string **[5]**

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 7, 0, 1

How many page fault occur for the following algorithm

– Optimal replacement

– LRU

No. of Frames = 3.

Total No. of Questions : 8]

SEAT No. :

**P3544**

[Total No. of Pages : 3

# [5038] - 303

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

## SOFTWARE ENGINEERING

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five of the following.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Attempt the following:

a) Explain waterfall model with diagram. **[4]**

b) What is coupling? Explain any 3 types of coupling. **[4]**

c) Define open system. **[2]**

***Q2)*** Attempt the following:

a) Write a note on questionarries. **[4]**

b) Define Software Engineering. Explain McCall's quality factors of software. **[4]**

c) What is Requirement Investigation? **[2]**

***Q3)*** Attempt the following:

a) Explain components of data dictionary. **[4]**

b) Explain maintenance side - effects. **[4]**

c) Define term: **[2]**

i) Tramp data.

ii) Bundling of data.

***P.T.O.***

***Q4)*** Attempt the following:

a) Write a note on Quality Assurance. **[4]**

b) What is testing? Explain stress testing and performance testing. **[4]**

c) What is preventive maintenance? **[2]**

***Q5)*** Attempt the following:

a) Explain term project organization. **[4]**

b) Write note on basis path testing. **[4]**

c) What is the role of co-ordinate module? **[2]**

***Q6)*** Attempt the following:

a) Explain in brief software engineering principles. **[4]**

b) Write a note on function oriented metrics. **[4]**

c) What is a alpha testing? **[2]**

***Q7)*** Attempt the following:

a) Explain prototyping approach. **[5]**

b) In a payroll system the dearness allowance depends on basic pay of the employee. **[5]**

DA = Basic *DA rate.

i) If basic is greater than 0 and less than 3500 then DA rate is 2.40%

ii) If basic is greater than 3500 and less than 6000 then DA rate is 2.10%

iii) If basic is greater than 6000 and less than 7150 then DA rate is 1.90%

iv) If basic is greater than 7150 then DA rate is 1.70%

Draw Decision tree for above case.

***Q8)*** Attempt the following:

a) Eligibility criteria for university examination for post graduate course is **[5]**

i) For Maharashtra domicile student should acquire minimum 45% marks in basic graduation.

ii) For Non-Maharashtra domicile student should acquire minimum 55% marks in basic graduation. Draw decision table for above case.

b) What are direct and indirect measures explain with example. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3545**

[Total No. of Pages : 3

# [5038] - 304

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

## CA-304 : JAVA

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any Five of the following.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Attempt all of the following:

a) What is type casting and give one example? **[4]**

b) Give an example where interface can be used to support multiple inheritance. **[4]**

c) What are the java features and explain any one? **[2]**

***Q2)*** Attempt all of the following:

a) Accept 'n' numbers from user pass it to sort function and display sorted elements. **[4]**

b) Write a java program to display the following pattern. **[4]**

1

2 3

4 5 6

7 8 9 10

c) What is a random access file? How it is different from sequential file? **[2]**

***P.T.O.***

***Q3)*** Attempt all of the following:

a) Explain update ( ) and repaint method. **[4]**

b) When do we declare a method or class as abstract and give example? **[4]**

c) Can we call the run ( ) method of thread object directly. State True or False. **[2]**

***Q4)*** Attempt all of the following:

a) Write a program to accept student information and display it using swing. **[4]**

b) Explain sleep ( ), wait ( ), suspend ( ) & stop ( ) method. **[4]**

c) What is print writer? **[2]**

***Q5)*** Attempt all of the following:

a) What is polymorphism? What are the types of polymorphism? Explain any one. **[4]**

b) Explain applet architecture. **[4]**

c) Explain - J Text field and J List. **[2]**

***Q6)*** Attempt all of the following:

a) What is serialization? Explain with an example. **[4]**

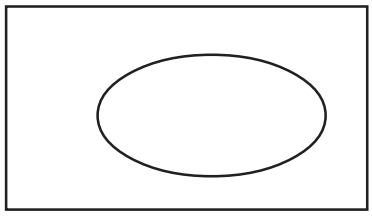
b) Write any 4 functions of string handling. **[4]**

c) What are data types in Java? **[2]**

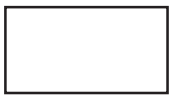
***Q7)*** Attempt all of the following:

a) Design a package to contain the class student and another package to contain the class sports accept student information and that students sport information and display it. **[5]**

b) Write a program to display pattern. **[5]**



***Q8)*** Attempt all of the following:

a) Write a program to display pattern  with fill color. **[5]**

b) Write a java program to create thread using runable. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3546**

[Total No. of Pages : 4

# [5038] - 305

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

## CA-307 : NUMERICAL METHODS

## (2013 Pattern) (Credit System)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five questions.***
2) ***Figures to the right side indicate full marks.***

***Q1)*** Attempt the following:

a) Use method of False position to determine the root of the equation $x^3 - x - 4 = 0$, which lies in the interval (1, 2). [Perform 3 iterations]. **[4]**

b) Given that **[4]**

$$\left(\frac{dy}{dx}\right) = x + y, \text{where } y(0) = 1$$

Find $y$ (0.1) and $y$ (0.2) by using Runge - Kutta second order method.

c) With usual notations, prove that $\Delta \equiv E\nabla$. **[2]**

***Q2)*** Attempt the following:

a) Suppose the polynomial $p(x)$ is given by the following table of values:

| $x$ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $p(x)$ | 0 | 4 | 20 | 54 |

Determine the polynomial $p(x)$, using general Newton's interpolation formula with divided differences. **[4]**

***P.T.O.***

b) Derive general quadrature formula for Numerical Integration. **[4]**

c) Use Euler's method to determine $y(0.05)$, given that $\left(\frac{dy}{dx}\right) = y - x$, where $y(0) = 1.2$. **[2]**

***Q3)*** Attempt the following:

a) If $f(1.1) = 2.9039$, $f(1.3) = 2.8865$ and $f(1.7) = 2.8516$, then find $f(1.4)$, by using Lagrange's interpolation formula. **[4]**

b) Define the operators $\Delta$ and , E and prove that $E = 1 + \Delta$. **[4]**

c) Write the definition of central difference operator '$\delta$'. **[2]**

***Q4)*** Attempt the following:

a) Find a root of the equation $\sin x = 1 - x$, by using Newton - Raphson method (Perform 3 iterations and take $x_0 = 0$). **[4]**

b) The velocities of a car at intervals of 2 minutes are given below:

| Time in minutes | 0 | 2 | 4 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|
| Velocity in km/hr | 0 | 22 | 30 | 27 | 18 | 7 | 0 |

Find distance covered by the car, by using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule. **[4]**

c) Define the term absolute error. **[2]**

***Q5)*** Attempt the following:

a) Find the polynomial $f(x)$, where $f(1) = 0$, $f(2) = 1$, $f(4) = 9$ and $f(6) = 25$. **[4]**

b) Given that $\left(\frac{dy}{dx}\right) = 1 + y^2$, where $y(0) = 0$. Use Runge - Kutta fourth order formula to find $y(0.2)$. **[4]**

c) Find $\int_0^6 f(x)\,dx$

where the function f (x) is given by the following table:

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| $f(x)$ | 0.15 | 0.31 | 0.11 | 0.21 | 0.34 | 0 | 0.12 |

(use trapezoidal rule). **[2]**

***Q6)*** Attempt the following:

a) Given that $\left(\frac{dy}{dx}\right) = 2x - y$, where $y(0) = 1$ use Euler's modified method to find $y(0, 1)$. **[4]**

b) Use Gauss Forward difference formula to determine $f(0.25)$, where the function $y = f(x)$ is given by the following table: **[4]**

| $x$ | 0.1 | 0.2 | 0.3 | 0.4 |
|---|---|---|---|---|
| $f(x)$ | 3.1051 | 3.2214 | 3.3498 | 3.4918 |

c) Round off the numbers to four significant digits 0.0030153, 0.00019. **[2]**

***Q7)*** Attempt the following:

a) Find the missing term in the following table **[5]**

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $f(x)$ | –1 | –2 | ? | 2 | 7 | 14 |

b) Consider the function $y = f(x)$ given by the following table:

| $x$ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $y = f(x)$ | 1.5 | 3.1505 | 4.7385 | 6.3010 |

Use Newton's interpolation formula, determine $f(1.8)$ **[5]**

***Q8)*** a) For the function $y = f(x)$ prove that $\Delta^4 y_0 = y_4 - 4y_3 + 6y_2 - 4y_1 + y_0$. **[5]**

b) From the following table of values of $x$ and $f(x)$, determine $f(1.65)$, by using Newtons interpolation formula. **[5]**

| $x$ | 1.2 | 1.4 | 1.6 | 1.7 |
|---|---|---|---|---|
| $f(x)$ | 3.264 | 4.172 | 5.248 | 5.856 |

Total No. of Questions : 8]

SEAT No. :

P3547

[Total No. of Pages : 2

# [5038] - 306

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

## CA - 308 : MULTIMEDIA SYSTEMS

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Solve any five questions.***
2) ***Figures to the right indicate full marks.***

***Q1)*** Answer the following:

a) Explain lossy and lossless compression. **[4]**

b) Explain the criteria for the classification of multimedia systems. **[4]**

c) Define Multimedia Document. **[2]**

***Q2)*** Answer the following:

a) Write short note on stereophonic and quadraphonic signal processing. **[4]**

b) Write short note on Document Type Definition (DTD). **[4]**

c) What is Logical Data Unit? **[2]**

***Q3)*** Answer the following:

a) Explain the architecture of an audio signal processing. **[4]**

b) Explain entropy coding. **[4]**

c) What is meant by document architecture. **[2]**

***Q4)*** Answer the following:

a) Explain how data is compressed using arithmetic coding. **[4]**

b) State and explain the goals of multimedia system services. **[4]**

c) Explain the working of an decoder. **[2]**

***P.T.O.***

***Q5)*** Answer the following:

a) Explain Linear Predictive coding. **[4]**

b) Differentiate between DPCM and ADPCM coding. **[4]**

c) List models of time. **[2]**

***Q6)*** Answer the following:

a) Explain technical issues in the design of a multimedia interchange format. **[4]**

b) Explain temporal transformation. **[4]**

c) List basic synchronization issues. **[2]**

***Q7)*** Answer the following:

a) What is intex active application? How it works over internet? **[5]**

b) Explain H-261 video compression techniques. **[5]**

***Q8)*** Answer the following:

a) Explain the significance of Multimedia Interchange formats in application context. **[5]**

b) Explain spectrum partition in detail. **[5]**

Total No. of Questions : 8]

SEAT No. :

P3548

[Total No. of Pages : 2

# [5038] - 307

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

## COMPUTER SCIENCE

## CA - 309 : Dot Net

## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five questions.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

***Q1)*** a) Explain Connected Architecture of ADO .NET with the help of diagram. **[4]**

b) Write a short note on Building Blocks of dot net framework. **[4]**

c) What is Polymorphism? Explain with suitable example. **[2]**

***Q2)*** a) Define Class. Explain Class Members. **[4]**

b) List and explain phases of garbage collection. **[4]**

c) Explain ADO .NET objects. **[2]**

***Q3)*** a) Explain Multicast Delegate in detail. **[4]**

b) Explain late binding with reflection. **[4]**

c) What is Garbage collection? **[2]**

***Q4)*** a) Differentiate between private and shared assemblies. **[4]**

b) What is synchronization? Explain synchronization issues. **[4]**

c) Attempt the following: **[2]**

i) What is CMS?

ii) List the exception building four keywords.

***P.T.O.***

***Q5)*** a) Explain ASP .NET architecture in detail. **[4]**

b) What is Web Server Control? **[4]**

c) Attempt the following: **[2]**

i) Explain explicit conversion

ii) What is delegate?

***Q6)*** a) Explain & collections with examples. **[4]**

b) Explain value types and reference types. **[4]**

c) Attempt the following: **[2]**

i) Explain any 2 most common properties of the control class.

ii) What is IIS?

***Q7)*** a) Write a program in C# (windows/console) which will read text files from mentioned file system location. Also list subdirectories from mentioned folder on the file system using system. IO name space and the available classes. **[5]**

b) Write a program in C# to change the background color of form and change font of text on the form as user select appropriate dialog box. (Use proper dialog box). **[5]**

***Q8)*** a) Explain State Management and it's Major Categories in details. **[5]**

b) Write a program in C # to calculate cube of a number. Throw: **[5]**

'Negative Number Exception', if the number is negative 'Zero Number Exception', if the number is zero.

(Accept the number from user).

Total No. of Questions : 8]

SEAT No. :

P3549

[Total No. of Pages : 3

# [5038] - 401

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

## CA - 401 : COMPUTER GRAPHICS

## (2013 Pattern) (Credit System)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five questions.***
2) ***Figures to the right side indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

***Q1)*** Attempt the following:

a) Explain the working of CRT display. **[4]**

b) Write a note on projections (perspective). **[4]**

c) Explain the terms: **[2]**

i) Hue.

ii) Saturation.

***Q2)*** Attempt the following:

a) What is viewing transformation? Explain the steps in the process. **[4]**

b) Explain 2D shear transformation. **[4]**

c) Define: **[2]**

i) Polygon.

ii) Planar polygon.

***P.T.O.***

***Q3)*** Attempt the following:

a) Explain the Uleiler-Atherton polygon clipping algorithm. **[4]**

b) Write a short note on position and selection interaction task. **[4]**

c) Define: **[2]**

i) Resolution.

ii) Refresh rate.

***Q4)*** Attempt the following:

a) Obtain 2D transformation matrices for **[4]**

i) Reflection at x-axis.

ii) Reflection at y axis.

iii) Reflection in the origin.

iv) Reflection in the line y = x.

b) Explain the components of computer graphics in brief. **[4]**

c) State the use of frame buffer memory. **[2]**

***Q5)*** Attempt the following:

a) Consider a line AB with A = (1, 2) and B = (8, 4). Apply simple DDA algorithm and calculate pixels in this line. **[4]**

b) Write a short note on printers. **[4]**

c) Explain the term : inter lacing. **[2]**

***Q6)*** Attempt the following:

a) Explain the steps in BSP tree method. **[4]**

b) Explain the window to viewport coordinate transformation. **[4]**

c) Define: **[2]**

i) Seed pixel.

ii) Run of pixels.

***Q7)*** Attempt the following:

a) Explain the B-spline basis function. **[5]**

b) Explain the different approaches to adding surface texture. **[5]**

***Q8)*** Attempt the following:

a) Explain run-length encoding technique. **[5]**

b) Explain the steps to perform rotation about an arbitrary axis in 3D. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3550**

[Total No. of Pages : 2

# [5038] - 402

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

## CA - 402 : SDK

## (2013 Pattern) (Credit System)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any five questions.***
2) ***Figures to the right side indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

***Q1)*** Answer the following:

a) What is handle? How to get handle for windows. **[4]**

b) Define scroll bar. Give two scroll bar handling functions in details. **[4]**

c) What is communication end point using TCP/IP? What is IP/address. **[2]**

***Q2)*** Answer the following:

a) Write a short note on message loop. **[4]**

b) List and explain functions used to draw lines. **[4]**

c) Explain DLL main functions. **[2]**

***Q3)*** Answer the following:

a) Write note on keyboard accelerators with accelerator table. **[4]**

b) Write program statement using Win32 API for capturing the mouse for an application window. **[4]**

c) "Bitmaps and Box are GDI premitives" Justify. **[2]**

***P.T.O.***

***Q4)*** Answer the following:

a) Explain any four clipboard functions. **[4]**

b) Explain dialog box procedure with example. **[4]**

c) Any menu that is attached to a window is automatically destroyed when window is destroyed justify. **[2]**

***Q5)*** Answer the following:

a) Explain Modeless Dialog Boxes in details. **[4]**

b) What are elements of Multiple Document Interface? **[4]**

c) "Timer Messages are Asynchronous". Justify. **[2]**

***Q6)*** Answer the following:

a) What is critical section? Give any three functions using critical section. **[4]**

b) Which function is used as entry point to windows program. Explain with syntax & parameter details. **[4]**

c) Give any two examples of window's string function. **[2]**

***Q7)*** Answer the following:

a) What is ODBC? Explain any three ODBC API. **[5]**

b) Explain any four keyboard messages (key stroke) **[5]**

***Q8)*** Answer the following: **[10]**

Write a Win SDK program that displays "Hello" when left mouse button is pressed & erased when released.

Total No. of Questions : 8]

SEAT No. :

**P3551**

[Total No. of Pages : 2

# [5038] - 403
# M.C.A. (Science Faculty)
## ADVANCE JAVA
## (2013 Pattern)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Neat diagram must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***Solve any five from the following.***

***Q1)*** Attempt each of the following:

a) What are transactions? Explain commit ( ) and rollback ( ) methods. **[4]**

b) What is Collection? Write benefits of collections framework. **[4]**

c) What are JSP scripting elements? Describe each in brief. **[2]**

***Q2)*** Attempt each of the following:

a) What is JSP? Explain JSP life cycle. **[4]**

b) Difference between the doGet ( ) and doPost ( ) methods. **[4]**

c) What is Stateless session bean and stateful session bean. **[2]**

***Q3)*** Attempt each of the following:

a) Explain the JDBC architecture. **[4]**

b) Explain factory method with suitable example. **[4]**

c) Explain compare ( ) and compare to ( ) method. **[2]**

***P.T.O.***

***Q4)*** Attempt each of the following:

a) Describe MAP and Explain hashmap with an example. **[4]**

b) Explain retrieving data from database to servlet with an example. **[4]**

c) Why is the need of session tracking and state session tracking methods? **[2]**

***Q5)*** Attempt each of the following:

a) Explain in detail Class, Driver Manager, Connection Interface & Statement Interface. **[4]**

b) Explain Life Cycle of servlet. **[4]**

c) What is Jar? **[2]**

***Q6)*** Attempt each of the following:

a) What is session? How to create session using get session. **[4]**

b) Write note on JSP architecture. **[4]**

c) Explain types of EJB. **[2]**

***Q7)*** Attempt each of the following:

a) Write a JDBC application to search a student record by accepting roll number from user, if student found then display all information (RN, name, address & contact number) other wise display message as "Student not found". **[5]**

b) Write a Java servlet program that reads string from user and display reversed string. **[5]**

***Q8)*** Attempt each of the following:

a) Write a JSP program to display all positive numbers which are accepted from user. **[5]**

b) Write a program to display the server machines date & time on the Client Machine. **[5]**

**Total No. of Questions : 8]** **SEAT No. :**

**P3552** **[Total No. of Pages : 3**

# [5038]-404

## M.C.A. (Science Faculty)

## CA-404: OBJECT ORIENTED SOFTWARE ENGINEERING

## (2013 Pattern) (Semester - IV) (Credit System)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Attempt any Five of the following.***

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

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

***Q1)*** Attempt the following :

a) Write a note on object oriented system development. **[4]**

b) Prepare a class diagram for "Hospital Management System". Consisting of atleast 3 classes. Define appropriate attributes with visibility, relationships, association with multiplicity. **[4]**

c) What is system design? **[2]**

***Q2)*** Attempt the following :

a) What is iterative development? Explain it's benefits. **[4]**

b) Consider a "Fixed Deposit" system, which allows customer to perform various transactions. Discuss different scenarios & draw sequence diagram. **[4]**

c) Define any two principles of modeling. **[2]**

***P.T.O.***

***Q3)*** Attempt the following :

a) Consider an automatic water level control system, which is used for controlling the water flow. Identify different states and draw state transition diagram. **[4]**

b) Write a note generic components of object oriented design model. **[4]**

c) Explain behavioral things of UML. **[2]**

***Q4)*** Attempt the following :

a) Prepare a class diagram for "News paper advertisement agency" consisting of atleast three classes. Define appropriate relationship, association with multiplicity. **[4]**

b) What is the use of deployment? Explain with suitable example. **[4]**

c) Specify the Testing types. **[2]**

***Q5)*** Attempt the following :

a) Prepare object diagram showing atleast 6 relationship among the following object classes show multiplicity – file system, file directory, ASCII file, Disk, Ordinary file, drive, track. **[4]**

b) Write a short on BBT and WBT. **[4]**

c) What is Unified Process? (UP) **[2]**

***Q6)*** Attempt the following :

a) Discuss architectural view of a software system in UML. **[4]**

b) Discuss coad and yourdon method (O.A) in detail. **[4]**

c) What are stubs and drivers? **[2]**

***Q7)*** Attempt the following :

a) A customer open a saving account in bank after filling an account opening form. If the form is valid specifying address proof, references etc then bank authority sanction the request and issue a Pass book. Customer can deposit of withdraw amount from his/her account and as per the rules getting an interest on available amount.

Customer may cancel account and get money back. During transactions the account balance is updated in the database and in the pass book. **[5]**

Considering above situation - draw use case diagram and sequence diagram.

b) Explain the terms in detail : **[5]**

i) Class

ii) Object

iii) Inheritance

iv) Polymorphism.

***Q8)*** Attempt the following :

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 individual and charges are according to routes.

A company has a offices in every city where booking clerk handles the cash. Customer can check the availability and also cancel the booking, get appropriate refund according to rules.

Draw following diagram by modeling system using UML. **[5]**

i) Activity diagram.

ii) Sequence diagram.

b) Write a note on overview of UML. **[5]**

**Total No. of Questions : 8]**

**SEAT No. :** ____

**P3553**

**[Total No. of Pages : 3**

# [5038]-405

## M.C.A. (Science Faculty)

## CA-407: CYBER LAW

## (2013 Pattern) (Semester - IV) (Credit System)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Attempt any Five questions.***

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

3) ***Neat diagram must be drawn wherever necessary.***

***Q1)*** Attempt the following :

a) What is attribution of electronic records. **[4]**

b) Discuss legal issues involved in Gold case. **[4]**

c) Define the term : **[2]**

i) Public Key

ii) Private Key

***Q2)*** Attempt the following :

a) Write a short note on secure electronic signature. **[4]**

b) Explain retention of electronic records. **[4]**

c) What is electronic form. **[2]**

***P.T.O.***

***Q3)*** Attempt the following :

a) Explain revocation of digital signature certificate. **[4]**

b) Explain the need of protecting intellectual property in detail. **[4]**

c) What is type squatting. **[2]**

***Q4)*** Attempt the following :

a) Discuss the remedies of infringements of trademarks. **[4]**

b) Explain the term trademark with types of trademarks. **[4]**

c) Define In-line Linking. **[2]**

***Q5)*** Attempt the following :

a) Write a short note on Cyber space. **[4]**

b) List the principles for deciding infringement of copyright. **[4]**

c) Define originator. **[2]**

***Q6)*** Attempt the following :

a) What are functions of trademark. **[4]**

b) Explain the term compensation in detail. **[4]**

c) Distinguish between Adware & Spyware. **[2]**

***Q7)*** Attempt the following :

a) Write short note on Tampering. **[5]**

b) State the objectives of Information Technology Act 2000. **[5]**

***Q8)*** Attempt the following :

a) What are DOS attacks. State the reasons for DOS attacks. **[5]**

b) What is the procedure for suspension of licence. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3554**

[Total No. of Pages : 4

# [5038]-406

## M.C.A. (Science Faculty)

## CA-408: SOFT COMPUTING

## (2013 Pattern) (Semester - IV) (Credit System)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any Five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to right indicate full marks.***
4) ***Assume suitable data, if necessary.***

***Q1)*** Attempt the following :

a) What are the salient properties and application of neural network? **[4]**

b) Consider two Fuzzy sets $\underset{\sim}{A}$ and $\underset{\sim}{B}$. Find following function theoretic operations for $\underset{\sim}{A}$ and $\underset{\sim}{B}$. **[4]**

i) $\underset{\sim}{A} \cup \underset{\sim}{B}$

ii) $\underset{\sim}{A} \cap \underset{\sim}{B}$

iii) $A \mid B$

iv) $B \mid A$

where $\underset{\sim}{A} = \left\{\frac{0.1}{1} + \frac{0}{2} + \frac{0.2}{3} + \frac{0.5}{4} + \frac{0.4}{5}\right\}$

$$\underset{\sim}{B} = \left\{\frac{1}{1} + \frac{0.5}{2} + \frac{0.6}{3} + \frac{0.8}{4} + \frac{0.5}{5}\right\}$$

c) State any two applications of genetic algorithm. **[2]**

***P.T.O.***

***Q2)*** Attempt the following :

a) Given the following Fuzzy sets. **[4]**

$$\underset{\sim}{A} = \text{small} = \left\{\frac{1}{1} + \frac{0.8}{2} + \frac{0.6}{3} + \frac{0.4}{4} + \frac{0.2}{5}\right\}$$

$$\underset{\sim}{B} = \text{large} = \left\{\frac{0.2}{1} + \frac{0.4}{2} + \frac{0.6}{3} + \frac{0.8}{4} + \frac{1}{5}\right\}$$

Find membership function for

i) $\underset{\sim}{A}$ slightly small and $\underset{\sim}{B}$ very large.

ii) $\underset{\sim}{A}$ not very small & $\underset{\sim}{B}$ very large.

b) How are genetic algorithm different from traditional methods. **[4]**

c) Define support of membership function. **[2]**

***Q3)*** Attempt the following :

a) Explain the mutation operator. What is the purpose of mutation operator? **[4]**

b) Describe components of artificial Neural Network. **[4]**

c) Draw the diagram of an artificial Neuron. **[2]**

***Q4)*** Attempt the following :

a) Write short note on Reinforcement learning. **[4]**

b) Given the following Fuzzy sets. **[4]**

$$\underset{\sim}{A} = \underset{\sim}{2} = \text{"approx 2"} = \left\{\frac{0.6}{1} + \frac{1}{2} + \frac{0.8}{3}\right\}$$

$$\underset{\sim}{B} = \underset{\sim}{6} = \text{"approx 6"} = \left\{\frac{0.8}{5} + \frac{1}{6} + \frac{0.7}{7}\right\}$$

using Zadeh extension principle calculate Fuzzy set "approx 12".

c) What is fuzzy equivalence relation? **[2]**

***Q5)*** Attempt the following :

a) What is Fuzzification? Which are different types of Fuzzifiers. Explain any two in brief. **[4]**

b) For the following relation R find the $\lambda$-cut relations for following value of $\lambda$. **[4]**
$\lambda = 0^+$, $\lambda = 0.1$, $\lambda = 0.4$, $\lambda = 0.7$

$$\text{where } \underset{\sim}{R} = \begin{bmatrix} 1 & 0.8 & 0.4 & 0.5 & 0.8 \\ 0.8 & 1 & 0.4 & 0.5 & 0.9 \\ 0.4 & 0.4 & 1 & 0.4 & 0.4 \\ 0.5 & 0.5 & 0.4 & 1 & 0.5 \\ 0.8 & 0.9 & 0.4 & 0.5 & 1 \end{bmatrix}$$

c) State the equation for sigmoidal signal function. **[2]**

***Q6)*** Attempt the following :

a) Using inference approach find membership values for triangular shapes I, R, E, T for triangle with angles 45°, 55°, 80°. **[4]**

b) What is Fuzzy relation? Describe operations on Fuzzy relations. **[4]**

c) What is weight space? **[2]**

***Q7)*** Attempt the following :

a) Explain perception learning algorithm with suitable example. **[5]**

b) Explain features of traditional optimization with types of search methods. **[5]**

***Q8)*** Attempt the following :

a) Given X = {a, b, c, d} Y = {1, 2, 3, 4} **[5]**

$$\underset{\sim}{A} = \left\{\frac{0}{a} + \frac{0.8}{b} + \frac{0.6}{c} + \frac{1}{d}\right\}$$

$$\underset{\sim}{B} = \left\{\frac{0.2}{1} + \frac{1}{2} + \frac{0.8}{3} + \frac{0}{4}\right\}$$

$$\underset{\sim}{C} = \left\{\frac{0}{1} + \frac{0.4}{2} + \frac{1}{3} + \frac{0.8}{4}\right\}$$

Determine the implication relation.

i) If X is $\underset{\sim}{A}$ then Y is $\underset{\sim}{B}$

ii) If X is $\underset{\sim}{A}$ then Y is $\underset{\sim}{B}$ else Y is $\underset{\sim}{C}$.

b) Differentiate between supervised learning and unsupervised learning. **[5]**

**Total No. of Questions : 8]** **SEAT No. :**

**P3555** **[Total No. of Pages : 3**

# [5038]-407

## M.C.A. (Science Faculty)

## CA-409: ARTIFICIAL INTELLIGENCE

## (2013 Pattern) (Semester - IV) (Credit System)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Attempt any Five questions.***

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

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

***Q1)*** Attempt the following :

a) Write a note on production system. **[4]**

b) Solve the water jug problem using state space search and seven problem characteristics. **[4]**

c) State any 4 applications of AI. **[2]**

***Q2)*** Attempt the following :

a) What is hill climbing? Explain any one hill climbing algorithm. **[4]**

b) Explain Mean analysis algorithm. **[4]**

c) What is the advantage of heuristic function. **[2]**

***P.T.O.***

***Q3)*** Attempt the following :

a) Write a note on Rote Learning. **[4]**

b) Explain the DFS search. State its advantages. **[4]**

c) State any 4 heuristic search techniques. **[2]**

***Q4)*** Attempt the following :

a) Explain the alpha-beta algorithm. **[4]**

b) Write a short note on learning from examples. **[4]**

c) State the significance of alpha cutoff in Alpha-Beta pruning. **[2]**

***Q5)*** Attempt the following :

a) Explain the algorithm of property inheritance. **[4]**

b) Discuss in brief the various issues in knowledge representation. **[4]**

c) What is semantic nets. **[2]**

***Q6)*** Attempt the following :

a) Translate each of the following sentence into predicate logic. **[4]**

i) Some students are intelligent and hardworking.

ii) Any horse that is gentle has been well trained.

iii) If all ripe bananas are yellow, then some yellow things are ripe.

iv) Snakes are not all poisonous.

b) Short note on frames. **[4]**

c) Differentiate between informed and uninformed searches. **[2]**

***Q7)*** Attempt the following :

a) Translate following sentences into WFFs in predicate logic. **[5]**

b) Note on lists in prolog. **[5]**

***Q8)*** Attempt the following :

a) Explain rule, predicate used in prolog. **[5]**

b) Construct a script for restaurant. **[5]**

Total No. of Questions : 8]

SEAT No. :

P3556

[Total No. of Pages : 3

# [5038]-501

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

## COMPUTER SCIENCE

## CA-501: Internet Programming

## (2013 Pattern) (Semester - V)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Answer any Five questions.***

2) ***Assume suitable data if necessary.***

***Q1)*** Attempt all of the following :

a) Explain any four string manipulation factions in PHP with example. **[4]**

b) Which are different class methods and object methods available in Pear DB. **[4]**

c) Write note on server sockets layer. **[2]**

***Q2)*** Attempt all of the following :

a) Explain how actually HTTP works in PHP. **[4]**

b) Write a program to traverse the directory structure and display the contents of each directory. **[4]**

c) Explain associative array in PHP. **[2]**

***P.T.O.***

***Q3)*** Attempt all of the following :

a) Write a short note on web services. **[4]**

b) Write a script to create an XML parser. **[4]**

c) Explain unsterilized and _ _wakeup methods **[2]**

***Q4)*** Attempt all of the following :

a) Write a php script to create self processing temperature conversion. **[4]**

b) Explain the faction used for approximate string equality. **[4]**

c) Explain mail() function of PHP. **[2]**

***Q5)*** Attempt all of the following :

a) Explain constructor and destructor with example. **[4]**

b) Write php script to send an email message. **[4]**

c) What is XML? **[2]**

***Q6)*** Attempt all of the following :

a) Explain function fread(), fwrite(),fgetc(),fgets(). **[4]**

b) Compare session and cookies. **[4]**

c) Explain the concept of "default parameters". **[2]**

***Q7)*** Attempt all of the following :

a) Write a program to read directory name and extension display the file with specified extension from that directory. **[5]**

b) Explain any five drawing functions in PHP. **[5]**

***Q8)*** Attempt all of the following :

a) Write a short note on PEAR DB. **[5]**

b) Write a PHP script to find intersection, set difference and union of two arrays using built- in function. **[5]**

**Total No. of Questions : 8]** **SEAT No. :**

**P3557** **[Total No. of Pages : 3**

# [5038]-502

## M.C.A. - III (Under Science Faculty)

## CA-502: PRINCIPLES OF PROGRAMMING LANGUAGES

## (2013 Pattern) (Semester - V)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Attempt any Five questions.***
2) ***Draw neat diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Answer the following :

a) Write a short note on calling sequence. **[4]**

b) Explain following premitives in LISP. **[4]**
   i) CONS
   ii) BUTLAST
   iii) LENGTH
   iv) ASSOC

c) Name two languages in which a program can write new piece of itself "on-the-fly". **[2]**

***Q2)*** Answer the following :

a) Explain the terms with example. **[4]**
   i) Facts
   ii) Rules
   iii) Predicates
   iv) Relations

b) What is a dope vector? State and explain the purpose of dope vector. **[4]**

c) Define: Just-in-time compiler. **[2]**

***P.T.O.***

***Q3)*** Answer the following :

a) "Expressions in purely functional languages are said to be referentially transperent". Comment. **[4]**

b) Describe how to maintain static chain during subroutine call. **[4]**

c) Show how ((10 20) 30 (40 50)) is implemented in LISP. **[2]**

***Q4)*** Answer the following :

a) Write short note on Remote Procedure call. **[4]**

b) Explain the concept of In-line expansion in detail. **[4]**

c) What is referencing environment. **[2]**

***Q5)*** Answer the following :

a) How does a in-line subroutine differ from macro. **[4]**

b) Write a LISP function that takes one list L as an argument & returns L with last element removed. **[4]**

c) What do you mean by l-value and r-value. **[2]**

***Q6)*** Answer the following :

a) What are stack pointer & frame pointer. **[4]**

b) Describe how association list and reference table are used to implement dynamic scooping. **[4]**

c) Define conformant array. **[2]**

***Q7)*** Answer the following :

a) Write short note on discrete and scalar types. **[5]**

b) State basic rules that are applied to PROLOG variables. Explain bound and free variables. **[5]**

***Q8)*** Answer the following :

a) Write a PROLOG program to find middle number of a list. **[5]**

b) Describe the four parameter passing modes. How does a programmer choose which one to use when. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3558**

[Total No. of Pages : 3

# [5038]-503

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

## COMPUTER SCIENCE

## CA - 503: Data Mining & Warehousing

## (2013 Pattern) (Semester - V)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Answer any Five questions.***

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

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

***Q1)*** Attempt all the following :

a) What are data mining issues? **[4]**

b) Write short note on Bayes Theorem. **[4]**

c) What is clustering? **[2]**

***Q2)*** Attempt all the following :

a) What is WEKA? List the advantages of WEKA. **[4]**

b) What are similarity and difference between data warehouse and database? **[4]**

c) What do you mean by active learning? **[2]**

***P.T.O.***

***Q3)*** Attempt all the following :

a) Explain basic data mining tasks of predictive model. **[4]**

b) Differentiate between agglomerative and divisive clustering method? **[4]**

c) What is Precision? **[2]**

***Q4)*** Attempt all the following :

a) Describe issues handle during data integration. **[4]**

b) What is non-linear regression? How non-linear regression equation transform to linear regression. **[4]**

c) Define Association rule. **[2]**

***Q5)*** Attempt all the following :

a) What are web mining application. **[4]**

b) Write short note on cross-validation. **[4]**

c) What is the confusion matrix? **[2]**

***Q6)*** Attempt all the following :

a) What is Market Basket analysis? **[4]**

b) Write short note on OLAP. **[4]**

c) Define a Logistic Regression. **[2]**

***Q7)*** Attempt all the following :

a) Explain FP-growth algorithm. **[5]**

b) Explain Hierarchical clustering. **[5]**

***Q8)*** Attempt all the following :

a) State five number summary use to draw box plot. **[5]**

b) Find frequent item set by Apriori method. **[5]**

Given minimum support count is 2.

| TID | List of Item |
|---|---|
| 1 | a, b, c |
| 2 | b, d |
| 3 | b, e |
| 4 | a, b, d |
| 5 | a, e |
| 6 | b, e |
| 7 | a, e |
| 8 | a, b, e, c |
| 9 | a, b, e |

Total No. of Questions : 8]

SEAT No. :

P3559

[Total No. of Pages : 3

# [5038]-504

## M.C.A. (Under Science Faculty)

## CA-504: SOFTWARE PROJECT MANAGEMENT

## (2013 Pattern) (Semester - V)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Attempt any Five out of eight questions.***

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

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

***Q1)*** Answer the following :

a) Explain in brief : scope control. **[4]**

b) What are ethics in Project Management? **[4]**

c) Why schedules are important in time management? **[2]**

***Q2)*** Answer the following :

a) Write a short note on activity sequencing. **[4]**

b) What are different tools & techniques used for quality control? **[4]**

c) What are the tripal constraints in Project Management. **[2]**

***P.T.O.***

***Q3)*** Answer the following :

a) Explain the CPM method in details. **[4]**

b) Define & Explain the terms : **[4]**

i) Planned Value (PV)

ii) Earned Value (EV)

iii) Schedule Performance Index (SPI)

iv) Cost Performance Index (CPI)

c) Define WBS. Give one example. **[2]**

***Q4)*** Answer the following :

a) Write a short note on project phases & project life cycle. **[4]**

b) State various approaches for improving communications. Explain any one in detail. **[4]**

c) Define control chart. why it is used? **[2]**

***Q5)*** Answer the following :

a) Describe how the probability/Impact matrix is used for qualitative risk analysis. **[4]**

b) Write a short note on statement of work. **[4]**

c) What do you mean by procurement? **[2]**

***Q6)*** Answer the following :

a) Explain staff acquisition activity in detail. **[4]**

b) Explain the term Stakeholder Management in detail. **[4]**

c) Define : Project Scope Statement. **[2]**

***Q7)*** Answer the following :

a) Write short note on strategic planning & project selection. **[5]**

b) Explain AOA/ADM method in detail. Give an example. **[5]**

***Q8)*** Answer the following :

a) What are various types of cost estimates? Explain any one in detail. **[5]**

b) What are the contents of project management plan? **[5]**

**Total No. of Questions : 8]**

**SEAT No. :** ____

**P3560**

**[Total No. of Pages : 2**

# [5038]-505

## M.C.A. (Science Faculty)

## CA-507: IMAGE PROCESSING

## (2013 Pattern) (Semester - V)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Answer any Five questions.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***Assume suitable data if necessary.***
4) ***Figures to the right indicate full marks.***

***Q1)*** a) Draw block diagram for fundamental steps in digital image processing. Describe Image acquisition. **[4]**

b) Explain Zooming and shrinking in digital images. How does it take place? **[4]**

c) Write the co-ordinates of the four neighbours (diagonal) of pixel P(x,y). **[2]**

***Q2)*** a) Define mixed adjacency. Explain how it eliminates ambiguity that often arises with 8-adjacency. **[4]**

b) What do you mean by illusion and Radiance? **[4]**

c) What is digital image processing? **[2]**

***Q3)*** a) What is Gamma correction? Explain. **[4]**

b) Explain image subtraction and Image Averaging? Why it is used in image enhancement? **[4]**

c) What is Smoothing? **[2]**

***P.T.O.***

***Q4)*** a) Write equations for obtaining 2D forward and inverse DFT. Give the meaning of each variable in equation. **[4]**

b) Write short note on ideal low pass filters. **[4]**

c) What is Convulation? **[2]**

***Q5)*** a) Explain the model for image degradation and restoration. **[4]**

b) Explain working of notch filters. **[4]**

c) What is inverse filtering? **[2]**

***Q6)*** a) Draw the shape for the orders n = 4, 6 & 8. Also give their chain code representation, first difference and shape numbers. **[4]**

b) Explain the basics of intensity thresholding. **[4]**

c) Define reflection and translation operations on set 'B'. **[2]**

***Q7)*** a) Explain erosion & dilation with the help of diagram. **[5]**

b) Give steps for filtering in frequency domain. **[5]**

***Q8)*** a) Explain Hit or Miss transformation. **[5]**

b) Explain working of adaptive, local noise reduction filter in detail. **[5]**

**Total No. of Questions : 8]**

**SEAT No. :** ____

**P3561**

**[Total No. of Pages : 3**

# [5038]-506

## M.C.A. (Science Faculty)

## COMPUTER SCIENCE

## CA-508: E-Commerce

## (2013 Pattern) (Semester - V)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Answer any Five questions.***

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

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

***Q1)*** Attempt all the following :

a) Explain need and role of e-commerce. **[4]**

b) Write a short note on video conferring. **[4]**

c) Define the following : **[2]**

i) Internet marketing

ii) Online shopping

***Q2)*** Attempt all the following :

a) Explain OSI Model. **[4]**

b) What are the different measures to ensure security? **[4]**

c) Define digital signature. **[2]**

***P.T.O.***

***Q3)*** Attempt all the following :

a) Explain EDI architecture. **[4]**

b) What is HDFS? List some features of HDFS? **[4]**

c) What is Domain Name? **[2]**

***Q4)*** Attempt all the following :

a) Give advantages and disadvantages of internet marketing. **[4]**

b) What is cyber law? Explain need of cyber law. **[4]**

c) Define cloud computing. **[2]**

***Q5)*** Attempt all the following :

a) Explain credit card payment process. **[4]**

b) Discuss e-commerce VS traditional commerce. **[4]**

c) What is befits ATM? **[2]**

***Q6)*** Attempt all the following :

a) Explain prepaid & postpaid e-payment system. **[4]**

b) Write short note on internet marketing techniques. **[4]**

c) What is role of 'Trojan Horse is a program'? **[2]**

***Q7)*** Attempt all the following :

a) What is the B2C model? List the steps used in B2C model. **[5]**

b) Explain Virtual Communities. **[5]**

***Q8)*** Attempt all the following :

a) Explain use of Multimedia technology in e-commerce. **[5]**

b) Explain different threats in e-commerce. **[5]**

**Total No. of Questions : 8]**

**SEAT No. :** ____

**P3562**

**[Total No. of Pages : 2**

# [5038]-507

## M.C.A. (Science Faculty)

## CA-509: MOBILE COMPUTING

## (2013 Pattern) (Semester - V)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Answer any Five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***All questions carry equal marks.***
5) ***Assume suitable data, if necessary.***

***Q1)*** a) Explain Message Oriented Middleware (MOM). **[4]**

b) What is wireless data protocol (WDP)? **[4]**

c) Explain "Why 3-tier architecture is better?" **[2]**

***Q2)*** a) Explain Radio Frequency Identification (RFID). **[4]**

b) What are requirements needed for mobile IP. **[4]**

c) Give two limitations of mobile computing. **[2]**

***Q3)*** a) Explain various mobile services of GSM. **[4]**

b) Write short note on WAP devices. **[4]**

c) What is server program? **[2]**

***P.T.O.***

***Q4)*** a) Explain Wireless Session Protocol (WSP). **[4]**

b) What is Wireless Data Protocol (WDP)? **[4]**

c) What is GPRS? **[2]**

***Q5)*** a) Explain need of small cells in cellular system. **[4]**

b) What are resources in android? **[4]**

c) What is Mobile Station (MS)? **[2]**

***Q6)*** a) What is Mobile TCP (M-TCP)? **[4]**

b) Explain use of VLR & HLR in GSM. **[4]**

c) List applications of context aware system. **[2]**

***Q7)*** a) Explain GPRS Architecture. **[5]**

b) Name the main elements of Mobile IP & describe their functions. **[5]**

***Q8)*** a) Explain components of SMS Architecture. **[5]**

b) What are the advantages and disadvantages of snooping TCP? **[5]**

Total No. of Questions : 8]

SEAT No. :

P3563

[Total No. of Pages : 2

# [5038]-601

## M.C.A. (Science Faculty)

## CA-602: SOFTWARE TESTING & QUALITY ASSURANCE

## (2013 Pattern) (Semester - VI)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Answer any Five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** Attempt all following :

a) What is software safety? **[4]**

b) What are testing fundamentals? **[4]**

c) Define Beta testing? **[2]**

***Q2)*** Attempt all following :

a) Explain concept of six-sigma Quality. **[4]**

b) Explain white box testing in detail. **[4]**

c) Define stub. **[2]**

***Q3)*** Attempt all following :

a) Explain scatter diagram with example. **[4]**

b) What SQA Activity? **[4]**

c) DefineDriver? **[2]**

***P.T.O.***

***Q4)*** Attempt all following :

a) Which characteristics lead to testable software? **[4]**

b) Explain attributes of effective software matrices. **[4]**

c) Write different testing tools. **[2]**

***Q5)*** Attempt all following :

a) Explain software reviews. **[4]**

b) What is Quality Movement? **[4]**

c) Define the term "Measure'. **[2]**

***Q6)*** Attempt all following :

a) Explain top down integration testing. **[4]**

b) Write short note on 'loop testing'. **[4]**

c) Explain nature of Errors. **[2]**

***Q7)*** Attempt all following :

a) Write steps required model based testing. **[5]**

b) What are the steps to design test cases? **[5]**

***Q8)*** Attempt all following :

a) Discuss load runner in detail. **[5]**

b) Write short note on 'statistical quality assurance'. **[5]**

Total No. of Questions : 8]

SEAT No. :

**P3564**

[Total No. of Pages : 2

# [5038]-602

## M.C.A. (Science Faculty)

## CA - 603: EMBEDDED SYSTEMS

## (2013 Pattern) (Semester - VI)

*Time : 3 Hours]* *[Max. Marks : 50*

***Instructions to the candidates:***

1) ***Answer any Five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

***Q1)*** a) What is embedded system? Give any two examples of embedded system. **[4]**

b) Discuss any one example of embedded system application. **[4]**

c) List any two company name who manufactures the microcontroller I.C. **[2]**

***Q2)*** a) Explain the components of Embedded system. **[4]**

b) Explain with Block diagram Van-Neuman architecture. **[4]**

c) What is size of in built RAM & ROM of 8051 microcontroller? **[2]**

***Q3)*** a) Explain the Basic Block diagram of 8051 microcontroller. **[4]**

b) Write a short note on instruction set of 8051 microcontroller with proper examples. **[4]**

c) List the interrupt priority of 8051 according height to lowest. **[2]**

***P.T.O.***

***Q4)*** a) Discuss the Resources & shared resources. **[4]**

b) Write a short note on multitasking. **[4]**

c) Define latency. **[2]**

***Q5)*** a) What is need of scheduler? **[4]**

b) What is difference between static priority & dynamic priority? **[4]**

c) Define the terms : **[2]**

i) Assembler

ii) Compiler

***Q6)*** a) Discuss the process & treads in embedded system development. **[4]**

b) Write a short note on Multitasking. **[4]**

c) Define the terms : **[2]**

i) Loader.

ii) Debuggers

***Q7)*** a) Differentiate between RISC & EISC processors. **[5]**

b) Discuss the software design cycle in details. **[5]**

***Q8)*** a) Write a short note on IDE. **[5]**

b) What is the functions of multiuser multitasking operating system? **[5]**

**Total No. of Questions : 8]**

**SEAT No. :**

**P3565**

**[Total No. of Pages : 3**

# [5038]-603

## M.C.A. (Science) (Part - III)

## CA-604: INFORMATION SECURITY AND AUDIT

## (2013 Pattern) (Semester - VI)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Answer any Five questions.***

2) ***Assume suitable data if necessary.***

***Q1)*** Solve the following :

a) Write short note on trap and trace systems. **[4]**

b) Write a short on Honey pots, Honey nets. **[4]**

c) Define Risk management. **[2]**

***Q2)*** Solve the following :

a) How scanning and analysis tools are useful in enforcing information security? **[4]**

b) With suitable sketches, explain the working of DES algorithm. **[4]**

c) Define steganography. What is the importance in using steganography tools? **[2]**

***P.T.O.***

***Q3)*** Solve the following :

a) Define firewall? What are its different type. Explain the working of each in detail. **[4]**

b) Discuss any two cryptography tools in details. **[4]**

c) Differentiate between laws and ethics. **[2]**

***Q4)*** Solve the following :

a) Describe in detail the designing of new security architecture. **[4]**

b) Explain with example the classical encryption schemes. **[4]**

c) What are the three types of security policies? **[2]**

***Q5)*** Solve the following :

a) What is information security blueprint? Identify its major components and formulate a cost benefit analysis. **[4]**

b) Explain VISA international security model in detail. **[4]**

c) Write the four important functions performed but information security for an organization. **[2]**

***Q6)*** Solve the following :

a) Explain the legal ethical and professional issues related to information security. **[4]**

b) What are the component of risk management? Explain each in detail. **[4]**

c) Describe the different ways in which smoke detectors are operating. **[2]**

***Q7)*** Solve the following :

a) Write a short note on Actine intrusion prevention. **[5]**

b) Write note on padded cell system. **[5]**

***Q8)*** Solve the following :

a) List and describe the four categories of locks in which situation is each types of lock preferred. **[5]**

b) Which security protocols are predominantly used in web based electronic commerce. **[5]**

**Total No. of Questions : 8]**

**SEAT No. :** [ ]

**P3566**

**[Total No. of Pages : 2**

# [5038]-604

## M.C.A. (Science)

## CA-605: CLOUD COMPUTING

## (2013 Pattern) (Semester - VI)

***Time : 3 Hours]*** ***[Max. Marks : 50***

***Instructions to the candidates:***

1) ***Answer any Five questions.***

2) ***All questions carry equal marks.***

***Q1)*** a) Discuss some security concerns that should be considered for cloud deployment. **[4]**

b) Enlist and explain essential characteristicss of cloud computing. **[4]**

c) What is cloud computing? **[2]**

***Q2)*** a) Describe the various cloud applications. **[4]**

b) Explain cloud computing reference model. **[4]**

c) Mention the services that are provided by Window Azure Operating System. **[2]**

***Q3)*** a) Give some examples of cloud computing services. **[4]**

b) What are Hybrid clouds? Give services in hybrid clouds. **[4]**

c) What are the advantages of using cloud computing? **[2]**

***P.T.O.***

***Q4)*** a) What are cloud deployment models? Explain private cloud. **[4]**

b) Explain storage and network virtualization with example. **[4]**

c) Give two benefits of virtualization. **[2]**

***Q5)*** a) What is mobile cloud computing? Why do we need mobile cloud computing? **[4]**

b) Write brief note on Big Table. **[4]**

c) Mention platforms which are used for large scale cloud computing? **[2]**

***Q6)*** a) Discuss the architecture of hyper–V and discuss its use in cloud computing. **[4]**

b) Explain the cloud computing security architecture. **[4]**

c) What is the difference in cloud computing and computing for mobiles? **[2]**

***Q7)*** a) Write note on Hadoop. **[5]**

b) What is secure execution environment and communication in cloud? **[5]**

***Q8)*** a) Explain the architecture of cloud file system (CFS). **[5]**

b) Write note on Microsoft Azure. **[5]**