

RS (28)

Madan Mohan Malaviya University of Technology, Gorakhpur

Centre for Management Studies

Roll no

2	0	1	6	0	2	4	1	2	8
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(Semester 2) Even Semester

Minor Test (I)

Subject Code: MBA 101	Subject Name: FUNDAMENTALS OF MANAGEMENT
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Time: 1 Hour

Marks: 15

Note: Attempt All Questions

Q1 "Management is getting work done through others". Evaluate the statement. (3)

Q2 Outline the managerial skill. A well skilled manager utilizes his resources in efficient way (3)

Last Date of showing answer books of Class Test-I is 28-01-2017

Roll No.	2	0	1	6	0	2	8	1	2	8
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MCA (SEM-II) Even Semester

Class Test (I) 2016-2017

Subject Code: MCA-107

Subject Name: Introduction to Database Management System

Time: 1 hr.

Marks: 15/10

Note: Attempt All questions.

- Q.1 Draw the Overall structure of Database and explain its various components in brief. 2
- Q. 2 (a) Define Generalization, Specialization, and Aggregation with a suitable example. 1.5 2
- (b) Bring six differences between database systems and file system. 2 2
- Q. 3 (a) What is the significance of database languages in database? Describe various types 2
of database languages in detail. 2
- (b) Draw the E-R Diagram of Library Management System. Assume the attributes of 2
your own. Represent the E-R Diagram into various tables also. 1

Last date of showing answer books of Minor Test I is 28-01-2017

Paper Code MCA-108

Roll No. 2016028128

MCA
(Sem. II) Even Semester
Minor Test – I, 2016-17
Subject: Information Security and Cyber Law

Time: 1 Hour

Max. Marks: 15

Note: Attempt all questions.

- Q.1. What do you mean by Physical Security for Information Systems? 03
- Q.2. Define security threat. Show the classification of threats. 03
- Q.3. Briefly describe functions of Hubs. 03
- Q.4. Draw and explain about IP Packet format in IPv4? 03
- Q.5. Briefly describe Security Challenges in Mobile Devices. 03

Q1. How object oriented programming differs from procedure oriented programming? Explain following basic concepts of OOP in short.

- a. Encapsulation
- b. Inheritance
- c. Polymorphism

02

Q2. (I) Write a C++ function that accepts two parameter n1 and n2 and prints all Pythagorean triple between n1 and n2. A Pythagorean triple consists of three positive integers a, b, and c, such that $a^2 + b^2 = c^2$. Such a triple is commonly written (a, b, c), and a well-known example is (3, 4, 5), (5, 12, 13).

02

Q2. (II) Write a C++ function that accepts n as parameter and prints Pascal triangle with level n. e.g. A Pascal triangle of level 3 is given below-

		1	
	1	2	1
1	3	3	1

02

Q3. (I) Consider an array with all its element either 0 or 1. Write a C++ function that accepts two parameters, pointer to first element and array size of mentioned array and rearrange the array in such a way that all element with value 0 are place in left and 1 in right of array. For example: Consider an array of size 5 with values [1,0,1,0,0]. After rearrangement, array should look like [0,0,0,1,1].

02

Q3. (II) Predict the output of below C++ programs if there is no error and explain the reason.

A

```
#include<iostream>
using namespace std;
class Test {
    int value;
public:
    Test(int v) {
        value = v;
    }
    int main() {
        Test t[100];
        return 0;
    }
}
```

B.

```
#include<iostream>
int main(){
    int X[]={10,25,30,55,110};
    int *p=X;
    while(*p<110){
        if(*p%3!=0)
            *p=*p+1;
        else
            *p=*p+2;
        p++;
    }
    for(int I=4;I>=1;i--){
        cout<<X[I]<<" ";
        if(I%3==0) cout<<endl;
    }
    cout<<X[0]*3<<endl;
}
```

C.

```
#include<iostream>
void Position(int &C1,int C2=3){
    C1+=2;
    C2+=Y;
}
int main(){
    int P1=20, P2=4;
    Position(P1);
    cout<<P1<<" "<<P2<<endl;
    Position(P2,P1);
    cout<<P1<<" "<<P2<<endl;
}
```

02

20, 9
20, 9

MCA Ist Year

Time: 1 hr.

Marks: 15

1. Note: Attempt All questions.
What is an Operating System? Explain in brief the various services provided by the operating system.

T2-2

3 - 2

2. (a) Define the essential properties of the following types of operating systems:

- a. Batch
- b. Interactive
- c. Time sharing
- d. Real time
- e. Distributed

T3-2-3

Q3

3

- (b) What is system call? Explain. You are also required to enlist all the system calls used in a typical file processing program.

T2-2

3

3. (a) (I) Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)? Which algorithm makes the most efficient use of memory?

- (II) Consider the following segment table:

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

T3-12

Q3

1.5

8.2 i

What are the physical addresses for the following logical addresses?

- (i). 0,430
- (ii). 1,10
- (iii). 2,500
- (iv). 3,400
- (v). 4,112

- (b) Consider the following page reference string:

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults would occur for Optimal page replacement algorithm, assuming three frames? Remember all frames are initially empty.

9-3 b

3

previous page

5 2 2 / 00
2 2 / 00
2 2 / 002 2 / 00
2 2 / 00
2 2 / 00

The last date of showing answer sheet is 27.01.2017

MCA I (Semester - 2)

roll no.

2 0 1 6 0 2 4 1 2 3

Test - 1(2016-17)

Applied computational methods : (BAS-24)

Time : 1 hour

M. M. 15

Note : Attempt all questions.

Q.1 Find one positive root of $x^3 - x - 1 = 0$ by Bisection method correct upto 4 decimal places.

Q.2 (a) Solve $x^3 - 5x + 3 = 0$ to find a root using Regula-Falsi method.

(b) Solve $x^3 - 6x + 4 = 0$ to find a positive root between 0 and 1 by Newton Raphson method.

Q.3 (a) Solve the following equations by Gauss-Siedel method:

$$x - 2y + 4z = 21 \quad \checkmark \quad z$$

$$3x + y + z = 1 \quad \checkmark \quad x$$

$$x + 3y - z = 11. \quad \checkmark \quad y$$

(b) Solve the following equations by Crout's method:

$$5x + 4y - 3z = 2$$

$$x - 3y + 4z = 12$$

$$3x + y + 2z = 16.$$

(Q1)

Is natural method of representing matrices in memory as 2D array suitable for sparse matrices? Justify your answer. How this can be overcome?

1.5

✓

Define Sparse Matrix and Identify the type of sparse matrices given below?

0.5

(i)

0	0	0	0	0	0
1	0	0	0	0	0
2	3	0	0	0	0
4	5	6	0	0	0
7	8	9	10	0	0
11	12	13	14	15	0

(ii)

1	2	0	0	0	0
3	4	5	0	0	0
0	6	7	8	0	0
0	0	9	10	11	0
0	0	0	12	13	14
0	0	0	0	15	16

(Q2)

(a). Write down the characteristics of an algorithm. What do you know about time-space trade-off? Which complexity is better among $O(n)$, $O(n^2)$ and $O(\log n)$? Justify your answer.

3

(b). In how many ways a 2D Array is represented? How is it treated in memory? Write down the address calculation formula for single dimensional array with a suitable example.

2

(Q3)

(a). Discuss the applications of the Linked List. How a Linked List is created? Write the algorithm for inserting a node at the begining of a Linked List.

1

(b). Can Polynomials be represented and added using an array? Justify your answer with the suitable examples. Write down the algorithm for Deletion in an Array.

2

Paper Code MCA-108

Roll No. X20160241629

MCA
(Sem. II) Even Semester
Minor Test – II, 2016-17

Subject: Information Security and Cyber Law

Time: 1 Hour

Max. Marks: 15

Note: Attempt all questions.

- Q.1. What is Electronic Data Interchange (EDI)? How does EDI work? 03
- Q.2. What is physical security? Explain the needs of physical security? 03
- Q.3. Discuss design issues in biometric systems. 03
- Q.4. Define various level of CMM model? 03
- Q.5. What are the economic and social aspects of the biometric system? 03

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(Semester 2) Even Semester

Minor Test (II)

Subject Code: MBA 101

**Subject Name: FUNDAMENTALS OF
MANAGEMENT**

Time: 1 Hour

Marks: 15

Note: Attempt All Questions

Q1 Explain in brief the contingency approach? Give the major task performed by a manager according to this approach? (3)

Q2(a) Explain how the idea of an unbroken chain of command is created by the process of delegating authority? (3)

(b) Discuss the term "Informal Organization Structure". How it is different from formal organization structure? (3)

Q3(a) What are the essential characteristics of good communication system? What is the importance of communication in management? (3)

(b) "Controlling is a fundamental function that ensures work accomplishment according to plans" Analyze the statement? (3)

Last Date of showing answer books of Class Test-II is 1-03-2017

Roll No. 20160241 X 29

MCA (SEM-II) Even Semester

Class Test (II) 2016-2017

Subject Code: MCA-107

Subject Name: Introduction to Database Management System

Time: 1 hr.

Marks: 10

Note: Attempt All questions.

Q.1 Differentiate among the terms Key, Candidate Key, Primary Key, Super Key, and Foreign Key with a suitable example. 2

Consider the following relational schema and answer the following queries in Relational Algebra:

- Employee (person-name, street, city)
- Works (person-name, company-name, salary)
- Company (company-name, city)
- Manages (person-name, manager-name)

- (i) Find the names of all employees who work for First Bank Corporation.
- (ii) Find the names and cities of residence of all employees who work for First Bank Corporation.
- (iii) Find the names of all employees in the database who live in the same city as the company for which they work.
- (iv) Find the names of all employees whose salary lies between Rs. 50K to Rs. 80K.

Q. 2 (a) What is SQL? Describe the various SQL data types with suitable example. 2

Consider the following database:

Employee (emp-no, name, skill, pay-rate)

Position (posting-no, skill)

Duty-allocation (posting-no, emp-no, day, shift)

Find the SQL queries for the following:

- (i) Get complete details from Duty-allocation.
- (ii) Get duty allocation details for emp-no 123461 for the month of April 2016.
- (iii) Get the shift details for employee "XYZ".
- (iv) Delete the skill field from Employee relation.

2
1.75
Q. 3 (a)
1.50
(b)

Describe Relational Calculus and Domain Calculus with a suitable example. 2

What are Views and Indexes? How views are created? Explain with a suitable example. List the various importance of View. 2

Describe the various Aggregate and Character functions of SQL with a suitable example. 2

The last date of showing answer sheet is 28.02.2017

MCA I (Semester - 2)

roll no.

2016024128

Test - 2(2016-17)

Applied computational methods : (BAS-24)

Time : 1 hour

Note : Attempt all questions.

M. M. 15

Q.1 Find the value of $f(1.5)$ and $f(4.5)$ using the following table:

X	1	2	3	4	5
$f(x)$	2	3	10	17	26

Q.2 (a) Using following table find cubic polynomial by Lagrange's method:

X	-1	0	2	23
$f(x)$	-8	3	1	112

(b) Find a cubic polynomial using given table by Newton's Divided Difference method :

X	0	1	2	5
$f(x)$	2	3	12	147

Q.3 (a) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's one third rule.

(b) Evaluate $\int_0^1 \frac{dx}{1+x^3}$ by using Simpson's three eight rule.

$$\frac{120}{2} x^{-\frac{6}{3}} = -360$$

Q1. Which data structure is used to implement recursion? Write down the advantages and the drawbacks of recursion? What is Tower of Hanoi Problem? Write down the recursive algorithm for this problem?

Q2 (a). Convert the expression $A - B / (C * D ^ E)$ into its Prefix and Postfix equivalents. Write down the algorithm for Evaluation of Postfix Expressions using Stack.

(b). In how many ways a stack can be implemented? What happens to Stack Top while PUSH and POP operations? Write down the algorithm for PUSH operation.

Q3 (a). Describe D-Queue briefly? Write down the algorithm for Deletion operation on Simple Queue. What happens to Front and Rear while implementing the insertion and deletion operations in a simple queue.

(b). What is the limitation of a Simple Queue and how is it overcome? Explain using a suitable example. Write down the algorithms for Insertion in Circular Queue.

Note: Attempt all questions. Q1 carries 2 marks. Q2 and Q3 are of 4 marks each.

Q1. Differentiate the following terms.

- a. Structure and Classes
b. Constructor and Destructor

02

2

Q2. (I) Define a class ITEM in C++ with the following description-
Private Members

1. Code of type integer (Item Code)
2. Iname of type string (Item Name)
3. Price of type float (Price of each item)
4. Qty of type integer (Quantity of item in stock)
5. Offer of type float (Offer percentage on the item)
6. A member function GetOffer() to calculate Offer percentage as per the following rule
 - a. If Qty <= 50 Offer is 0
 - b. If 50 < Qty <= 100 Offer is 5
 - c. If Qty > 100 Offer is 10

02

1

Public Members

1. A function GetStock() to allow user to enter values for Code, Iname, Price, Qty and call function GetOffer() to calculate the offer.
2. A function ShowItem() to allow user to view the content of all the data members

Q2. (II) Define a class ComplexNumber in C++ with following description-

Private Members

1. Real
2. Imaginary

X

02

X

Public

1. A function Add() that accepts two complex number objects as argument and return a complex number object which is the addition of parameter passed to function.
2. A function Multiply() that accepts two complex number objects as argument and return a complex number object which is the multiplication of parameter passed to function.
3. A function Sub() that accepts two complex number objects as argument and return a complex number object which is the subtraction of parameter passed to function.
4. A function Div() that accepts two complex number objects as argument and return a complex number object which is the Division of parameter passed to function.

Also define the constructor that automatically initializes the complex number object.

Q3. (I) Define a class Box in C++ with constructor overloading with following description-
Private Member

1. Length
2. Width
3. Height

02

1

Public Member

1. A function Display() that displays the values of all members of Box object

Overload constructor Box with no argument, one argument, two argument and three argument.

Q3. (II) Explain copy constructor with example. Discuss the case where it is usefull.

02

1

Time: 1 hr.

Marks: 15

Note: Attempt All questions.

1. Assume you have the following jobs to execute with one processor

Process	Burst Time	Priority	Arrival Time
P1	75	3	0
P2	40	2	10
P3	25	1	20
P4	20	0	80
P5	45	2	85

The system uses Preemptive scheduling algorithm:

- Create a Gantt chart illustrating the execution of these processes.
- What is the Turnaround Time for Process P3?
- What is the average Turnaround Time?
- What is the average Waiting Time?

2. (a) Consider a variant of the RR scheduling algorithm where the entries in the ready queue are pointers to the PCBs.

i). What would be the effect of putting two pointers to the same process in the ready

P>1 (48)

```
repeat
flag[i] := true;
while flag[j]
do if turn = j
    then begin
        flag[i] := false;
        while turn = j do no-op;
        flag[i] := true;
    end;
critical section
turn := j;
flag[i] := false;
remainder section
until false;
```

The structure of process P_i ($i = 0$ or 1), with P_j ($j = 1$ or 0) being the other process as given in the code.

Prove that the algorithm satisfies all three requirements for the critical-section problem.

(b) Write a semaphore based solution for Producer Consumer problem. You are also required to explain the producer consumer problem first and the algorithm used for its solution.

RS (20)

Madan Mohan Malaviya University of Technology, Gorakhpur

Centre for Management Studies

Roll no

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(Semester 2) Even Semester

Minor Test (III)

Subject Code: MBA 101

**Subject Name: FUNDAMENTALS OF
MANAGEMENT**

Time: 1 Hour

Marks: 15

Note: Attempt All Questions

Q1.

Explain any two theories of motivation in detail? (3)

Q2 (a)

Explain the responsibilities of good managers in making ethical decisions. (3)

(b)

Describe Maslow's self development theory with example. (3)

Q3 (a)

Write short notes on:

i.

Management by objectives

ii.

Controlling steps

(3)

(b)

Explain Japanese management and give its techniques? (3)

Last date of showing answer books of Minor Test I is 29-03-2017

Paper Code MCA-108

Roll No. 2016024128

MCA

(Sem. II) Even Semester
Minor Test – III, 2016-17

Subject: Information Security and Cyber Law

Time: 1 Hour

Max. Marks: 15

Note: Attempt all questions.

- Q.1.** Why we use keys in cryptography? Explain the concept of public and private keys? 03
- Q.2.** Describe authentication mechanism in VPNs? 03
- Q.3.** Explain the need of intrusion monitoring and detection system? 03
- Q.4.** Define various security services 03
- Q.5.** How does tunneling protocol works for VPNs? 03

Last Date of showing answer books of Class Test-III is 29-03-2017

Roll No.	2	0	1	6	0	2	4	1	X	2	8
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MCA (SEM-II) Even Semester

Class Test (III) 2016-2017

Subject Code: MCA-107

Subject Name: Introduction to Database Management System

Time: 1 hr.

Marks: 10

Note: Attempt All questions.

Q.1 ✓ What is Functional Dependency? List the various Armstrong's axioms of functional dependencies. Given a relation $R = \{A, B, C, D, E\}$ and the corresponding set of FDs: $F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$. 1/2

Find out candidate keys of relation R.

Q.2 (a) What is Normalization? Describe 3NF with a suitable example. How 3NF is different with BCNF? 2

(b) ✓ What is Multi-Valued Dependency? Discuss 4NF and 5NF with a suitable example. 1 2

Q.3 (a) Describe the Inclusion and Join dependencies with a suitable example. 1/2 2

(b) ✓ What are Dependency preserving and Lossless Join decomposition? Explain with a suitable example. 1 2

Roll No. 20160241X28

SEM. IInd (Even Semester)
Minor/Class Test (III) 2016-2017

Subject Code : MCA 106

Subject Name : Operating System Concepts

MCA Ist Year

Time: 1 hr.

Marks: 15

Note: Attempt All questions.

1. Consider the following snapshot of a system:

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

- i) What is the content of the Need Matrix?
 ii) Is the system in a safe state?
 iii) If a request from P1 arrives for (0, 4, 2, 0) can the request be granted immediately?

2. (a) Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock free.
 (b) Use tree height reduction techniques to produce versions of the following expression more amenable to parallel evaluation. In each case draw evaluation trees for the original expression and new expression.

i. $(p+(q+(r+s)))$ ii. $((a+b*c*d)*e)$
 iii. $(m+(n*p*q*r)+a+b+c)$

3. (a) Why rotational latency is usually not considered in disk scheduling? How would you modify SSTF, SCAN, and C-SCAN to include latency optimization?
 (b) There are 1000 cylinders on a disk, numbered from 0 to 999, compute the number of tracks the disk arm must move to satisfy all requests in the disk queue. Assume the last request serviced was at track 345 and current position is at track 615. The queue in FIFO order contains the requests for the following tracks:
 123, 874, 692, 475, 105, and 376.

Perform the computation for the SCAN and SSTF disk scheduling algorithm

Minor Test - III
MCA, 2nd Sem.
2016-17

Department of CSE, MMMUT Gorakhpur
Data Structures & Applications (MCA - 102)

Time: 1hrs

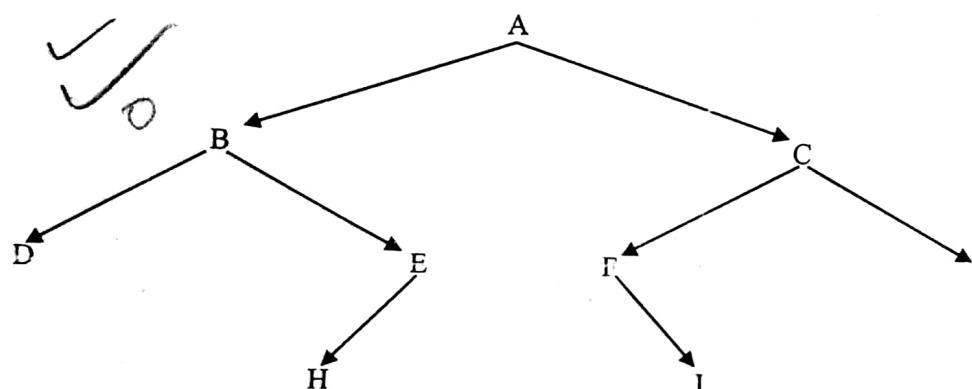
Marks: 15

Note: Attempt all questions. Q1 carries 3 marks. Q2 and Q3 are of 6 marks each.

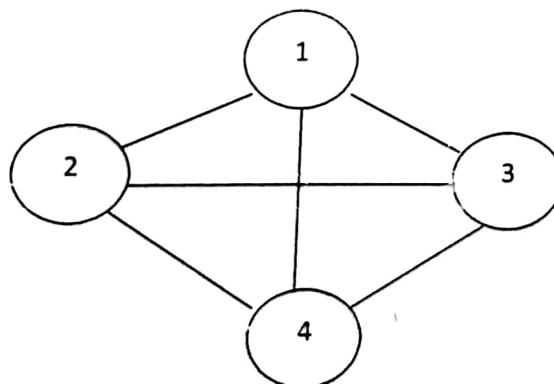
Q1. ✓ How a Binary Tree is represented using an Array and using a Linked List? Show using the examples. Draw a Binary Tree for the expression $(A+B) * (C+D)$ 3

Q2 (a). ✓ Which traversal techniques are used in Tree and Graph? Explain these techniques in short. Which data structures are used in the traversal algorithms of Graph? 3

(b). Write down the Inorder, Preorder and Postorder expressions for following binary tree:



Q3 (a). What are the various ways to represent the Graphs? Write down the Adjacency Matrix and Adjacency List for the following Graph: 3



(b). Write in short on following-

- (i) Binary Search Tree
- (ii) Height Balanced Binary Tree AVL
- (iii) Threaded Binary Tree

The last date of showing answer sheet is 30.03.2017

MCA I (Semester - 2)

roll no.

2016024128

Test – 3 (2016-17)

Applied computational methods : (BAS-24)

Time : 1 hour

M. M. 15

Note : Attempt all questions.

Q.1 Solve $\frac{dy}{dx} = 2x + y^2$; $y(0) = 1$ by Picard's method.

Q.2 (a) Solve $\frac{dy}{dx} = x + y$; $y(0) = 0$ by Euler's method to find $y(0.5)$.

(b) Solve $\frac{dy}{dx} = x + y^2$; $y(0) = 1$ to find $y(0.1)$ by using Runge-Kutta method of order four.

Q.3 (a) Solve the difference equation:

$$a_r - 5a_{r-1} + 6a_{r-2} = 0; \quad a_0 = 7, \quad a_1 = 18$$

(b) Solve the difference equation:

$$a_r + 6a_{r-1} + 9a_{r-2} = 3; \quad a_0 = 0, \quad a_1 = 1.$$

Time: 3 hrs.

40

Maximum Marks:

NOTE: ATTEMPT ALL QUESTIONS. Each question carries equal marks.

Q1. Attempt any three of the following. Q.1 (a) is compulsory.

- a. Explain why the study of Management Theory is important for managers. Explain the contribution of F.W.Taylor in development of management thoughts? (4)
- b. Discuss the contribution of 'Hawthorne Experiment' in the development of managerial thinking. State the outcomes of experiments conducted under Hawthorne experiment. (3)
- c. Explain how the contribution of Henry Fayol in the development of management thought. (3)
- d. What are the qualities of manager identified by Fayol? Explain those qualities with example. (3)
- e. Explain why organizations need manager? What are general managerial functions included in management? (3)

Q2. Attempt any three of the following. Q.2 (a) is compulsory.

- a. Explain the Delphi and Nominal techniques of group decision making. How Brainstorming technique can be effective tool for coming up with creative ideas? (4)
- b. Why a well structured organization is recommended for any business? What factors affect the span of management? (3)
- c. Explain three types of decision making techniques? What are the essential characteristics of good decision? (3)
- d. What is decentralized organization? What can be the advantages and disadvantages of being employed in a decentralized organization? (3)

Q3 Attempt any three of the following. Q.3 (a) is compulsory.

- a. How planning is a basis of controlling, explain? Identify importance of controlling in management. What are the various steps in controlling process? (4)
- b. Explain the concept of communication in management? Is non verbal communication more effective than verbal communication? Discuss (3)
- c. "Communication is a two way process" explain the statement? State the merits and demerits of grapevine communication? (3)

- d. Define communication and process of communication. Discuss the relative merits and demerits of formal and informal channels. (3)

Q4. Attempt any three of the following. Q.4 (a) is compulsory.

- a. Describe Maslow's self development theory with example. What are the methods of self motivation? (4)
- b. How Self development can be applied to each levels of organization? Explain the Johari window of self awareness. (3)
- c. Explain Japanese management and its techniques. How is it different from American management? (3)
- d. What is quality management? Explain the Quality of work-life (QWL) in management, with its elements. (3)

M.C.A. 1st Year, Semester: 2nd

Major Examination: 2016 – 2017

Subject: Information Security and Cyber Laws

Time: 3 Hrs

Max. Marks: 40

*Note : Attempt all questions as per directions given thereof. All questions carry equal marks.
Be precise in your answer. Make necessary assumption if required.*

1 Attempt any **three** of the followings from Unit –I Q. 1(a) is compulsory.

- (a) Describe the need of distributed information system? Define information security. 4
 Explain physical security and network security model with the help of diagram. 3
- (b) Differentiate the following:
 (i) Threats and Attacks
(ii) Threats and Security
(iii) IPv4 and IPv6
- (c) What are the challenges in establishment of secure networks? Describe security implication for organizations. 3
- (d) Illustrate classification of threats and assessing damages. What are the security challenges in mobile devices? 3

2 Attempt any **three** of the followings from Unit –II Q. 2(a) is compulsory.

- (a) Explain how confidentiality can archive? Also describe Integrity and Availability in Information security. 4
- (b) Define Biometric systems. Discuss design issues in biometric systems. Also write the benefits of biometrics and the criteria used while selecting the biometric system? 3
- (c) Explain the security issues in the electronic transaction? What is Electronic Data Interchange (EDI)? Discuss the advantage and disadvantage of EDI? 3
- (d) What do you mean by access to an information resource? Discuss differences in authentication and user identification. Why we needs ISO 27001. 3

3 Attempt any three of the followings from Unit -III Q. 3(a) is compulsory.

- (a) Consider source A that produces a message in plaintext $X=[X_1, X_2, \dots, X_M]$, the message is intended for destination B, notations public key PU, private key PR.
 Describe Public-Key Cryptosystems with help of suitable diagrams to show Confidentiality, Authentication separately and further Confidentiality and Authentication together with help of suitable diagrams. Write applications for Public-Key Cryptosystems. 4

- (b) List the various design goals for firewall. Define general techniques for control access. 3
 Discuss packet filtering firewalls and their advantages and disadvantages. 3
- (c) Briefly explain intrusion, intrusion detection, intrusion prevention and components of intrusion detection systems. 3
- (d) What is a digital signature? Write applications of digit signatures. What are the requirements for digital signatures? 3

- 4 Attempt any three of the followings from Unit -IV Q. 4(a) is compulsory. 3
- (a) How does copyright is different from patent? What do you mean by Cyber crime? Name 3
- (b) different types of cyber crime in India. Explain any one. 3
- (c) What is software Piracy? Explain different activity in software piracy. 4
 Write notes on:- 3

- (i) Investigation and Ethics
- (ii) Data privacy and protection
- (iii) IT Act2000

- (d) What is intellectual property (IP)? Define three types of intellectual property? What are 3
- the ethical issues in intellectual property rights?

MCA
SECOND SEMESTER
Major Examination: 2016-2017
Subject: Introduction to Database Management Systems

Time: 03 Hrs

Max. Marks: 40

Note: Attempt ALL questions. Each question carries equal marks.

Q.1 Attempt any three of the following. Q.1 (a) is compulsory.

- a) Describe the three-level architecture of DBMS. Why do we need mappings between different schema levels? 4
- b) What is the significance of Data Independence in DBMS? Differentiate between Physical and Logical Data Independence. 3
- c) What is the significance of Key in DBMS? Describe the concept of Super Key, Primary Key, Foreign Key and Candidate Key with a suitable example. 3
- d) Define the term Generalization and Specialization with a suitable example.

Consider the following suppliers-parts-projects database:

S (S#, SNAME, STATUS, CITY)

P (P#, PNAME, COLOR, WEIGHT, CITY)

J (J#, JNAME, CITY)

SPJ (S#, P#, J#, QTY)

Where, S: Information of Suppliers, P: Parts, J: Projects, SPJ: Supplied Quantity

Draw its E-R Diagram. 3

Q.2 Attempt any three of the following. Q.2 (a) is compulsory.

- a) What is Relational Algebra? Illustrate the various set-oriented and relation-oriented operations of relational algebra with a suitable example. 4

- b) Describe four aggregate functions of SQL with a suitable example.

Consider the following database:

Employee (Emp_no, Name, Skill, Pay_rate)

Position (Posting_no, Skill)

Duty-allocation (Posting_no, Emp_no, Day, Shift)

Find SQL queries for the following:

- i. Get complete details from Duty-allocation.
- ii. Find the entire details of employees whose name starts with character 'A'.

- iii. Find the shift details for employee "XYZ".
- iv. Find the employees eligible to fill a position
- v. Get the list of employees not assigned a duty.
- c Define and differentiate the tuple oriented relational calculus and domain oriented relational calculus with a suitable example. 3

d What are Index and View? What are their advantages? Explain the syntax for creating Views. 3

Q.3 Attempt any three of the following. Q.3 (a) is compulsory.

- a What do you mean by Normalization? Explain 3NF with a suitable example. 4
- b What is Inclusion Dependency? Describe BCNF with a suitable example. Is BCNF stronger than 3NF? Justify your answer with a suitable example. 3
- c A relation R (A, B, C, D, E) has the following set of FDs:
 $A \rightarrow BC$, $B \rightarrow E$, $C \rightarrow D$, $A \rightarrow E$, $D \rightarrow B$
Is the decomposition of this relation to R_1 (A, B, C), R_2 (C, D), R_3 (B, D, E) lossless and/or dependency preserving? Justify your answer. 3
- d What is Functional Dependency (FD)? How is it different from Multi Valued Dependency (MVD) and Join Dependency (JD)? Give an example of each of MVD and JD. 3

Q.4 Attempt any three of the following. Q.4 (a) is compulsory. 3

- a What is Transaction? Describe ACID properties of transaction. Draw a state diagram and discuss the typical states that a transaction passes through during execution. 4
- b What do you mean by Deadlock? What are the various conditions under which a deadlock occurs? Discuss the Wait-die and Wound-wait scheme in detail. 3
- c Differentiate between the working of time stamping techniques and locking techniques of concurrency control with a suitable example. 3
- d What is Serializability? Explain Conflict and View serializability with a suitable example. 3

Roll No.	2	0	1	6	0	2	4	1	2	8	X
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MCA
QUESTION PAPER
Session 2016-2017

Paper Code: MCA 106

Semester : Second (Even)

Session : 2016-2017

Time : Three Hours

Name of the Subject: **Operating System Concepts**

Year : 2017

Maximum Marks: 40

Note: Answer all the Questions:

Please specify: Requirements of Graph Paper / Steam Table / Statistical Table / Log Table / Calculators (if any): **Calculator**

Q. No.	Marks
1. Attempt any Three parts of the following. Q 1(a) is compulsory:	4+3+3=10
(a) (I) Consider a logical-address space of eight pages of 1024 words, each mapped onto a physical memory of 32 frames then	
(i) How many bits are in the logical address?	
(ii) How many bits are in the physical address?	
(II) Why might a global replacement policy be more susceptible to thrashing than a local replacement policy? Explain.	
(b) What is the main advantage of multiprogramming? In a multiprogramming and time sharing environment, several users share the system simultaneously. This situation can result in various security problems.	1-5
(i) What are two such problems?	
(ii) Can we ensure the same degree of security in a time-shared machine as we have in a dedicated machine? Explain.	
(c) Consider the following reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6	
Find the number of page faults for Least Recently Used (LRU) page replacement algorithm for 3 page frames. (Assume initially all page frames are empty)	1
(d) What is system call? Explain. You are also required to enlist all the system calls used to handle processes in a computer system.	

Q. No.

4+3+3=10

2. Attempt any Three parts of the following, Q 2(a) is compulsory:

(a) Consider the following set of processes having their burst time in milliseconds:

Processes	Arrival Time	Burst Time
1	0	25
2	7	15
3	15	18
4	20	27
5	25	12

- (i) Illustrate the allocation of processes to CPU with the help of Gantt Chart using preemptive Round Robin algorithm. The Time Quantum or Slice is 5(five) units.
- (ii) Calculate the average turnaround and waiting time.

(b) What is critical-section problem? Explain.

The first known correct software solution to the critical-section problem for two processes was developed by Dekker. The two processes, P_0 and P_1 , share the following variables:

```
var flag: array [0..1] of boolean; (* initially false *)
```

```
turn: 0..1;
```

```
repeat
```

```
flag[i] := true;
```

```
if flag[i]
```

```
then begin
```

```
flag[i] := false;
```

```
while turn = j do no-op;
```

```
flag[i] := true;
```

```
end;
```

```
critical section
```

```
turn := j;
```

```
flag[i] := false;
```

```
remainder section
```

```
until false;
```

The structure of process P_i ($i = 0$ or 1), with P_j ($j = 1$ or 0) being the other process as given in the code.

Prove that the algorithm satisfies all three requirements for the critical-section problem.

(c) What are the different kinds of operations possible on a process? Enlist them and briefly describe each of them.

(d) Explain the following terms with suitable example or diagram:

- (i) Turnaround Time
- (ii) Waiting Time
- (iii) Response Time
- (iv) Execution time

You are also required to give the use of the above time metrics.

Q. No.

Marks

3. Attempt any Three parts of the following, Q 3(a) is compulsory:

4+3+3=10

(a) Explain Banker's algorithm concerning to deadlock.

Consider the following snapshot of a system at time t_0 :

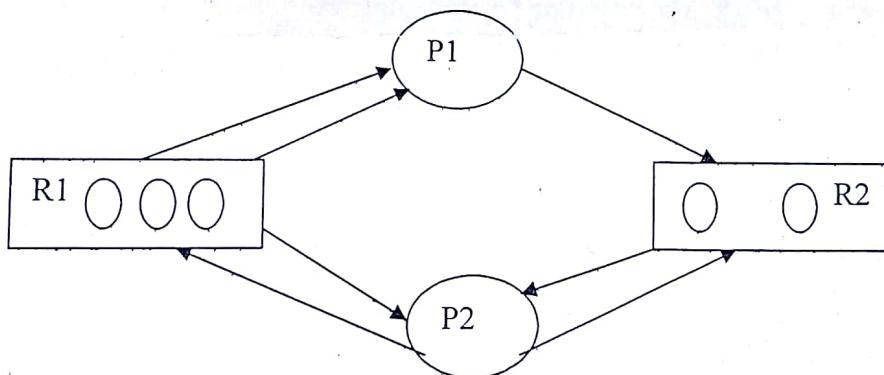
✓

Processes	Allocation	Max	Available
P ₀	10	5	3
P ₁	4	2	
P ₂	9	2	

0.5

- i) What is the content of the Need Matrix?
- ii) Is the system in a safe state?
- iii) If a request from P₂ arrives at time t_1 for one more resource, can the request be granted immediately? If yes, is it safe?

(b) Consider the following resource allocation graph.



- (i) Is the system deadlocked?
- (ii) What is the status of the system if P1's request for R2 is granted first?
- (iii) What is the status if P2's request for R2 is granted first?

(c) Suppose a disk has 201 cylinders, numbered from 0 to 200. At some time the disk arm is at cylinder 100, and there is a queue of disk access requests for cylinders 135, 85, 105, 100, 90, 110, 30 and 145. If Shortest-Seek Time First (SSTF) is being used for scheduling the disk access, the request for cylinder 90 is serviced after servicing how much number of requests.

- ✓* (d) Why rotational latency is usually not considered in disk scheduling? How would you modify SSTF and Elevator algorithm of disk scheduling to include latency optimization?

Q. No.	Marks
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4. Attempt any **Three parts** of the following, Q 4(a) is compulsory:

$4+3+3=10$

- ✓* (a) Explain UNIX directory structure as well as I-node structure. What is the use of double indirect block in UNIX and what would be maximum file size, if disk block size is 512 KB and 2KB is required for storing the address of a disk block using up to double indirect in UNIX?
- ✓* (b) What are different access methods of files? Explain. You are also required to enlist and explain the different attributes of the file with example *1*
- ✓* (c) What do you mean by external and internal commands concerning to MS-DOS? Explain. You are also required to give Three commands along with syntax for each category of commands.
- ✓* (d) What does each row and column represent in an access matrix? Explain. What is the problem when using a global table to represent an access matrix?

MCA
Year: 1st, Semester: 2nd
Major Examination: 2016-17
Applied Computational Methods

Max. Time: 3Hrs**Max Marks: 40****Note: Attempt all questions. Each question carries equal marks.****Note: Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from remaining three parts of each question.**

1. Attempt any three parts of the following. Q.1(a) is Compulsory.
- (a) Find real root of $x^3 - 3x - 5 = 0$ by Regula-Falsi method. 3 4
- (b) Solve $x^4 - x - 13 = 0$ to find a root between 1 and 2 by Newton-Raphson method.
- (c) Using Gauss-Siedel method, find the solution of following equations:
- $$\begin{aligned} x + 2y + 6z &= 22; \\ 6x - y - z &= 19; \\ 3x + 4y + z &= 26. \end{aligned}$$
- (d) Use Crout's method to solve the following system of equations:
- $$\begin{aligned} x + 2y + 3z &= 14; \\ 2x + 5y + 2z &= 18; \\ 3x + 2y + 5z &= 22. \end{aligned}$$

2. Attempt any three parts of the following. Q.2(a) is Compulsory.

- (a) From table given below, find the values of $f(1.5)$ and $f(4.5)$ using Newton's forward and backward interpolation formula. 3 + 1 = 4

x	1	2	3	4	5
$f(x)$	2	3	10	17	26

- (b) Use Lagrange's formula to find cubic polynomial from table given below: 2 + 1 = 3

x	-1	0	2	23
$f(x)$	-8	3	1	112

- (c) Find $f(x)$ as a polynomial using Newton divided difference method: 3

x	3	2	1	-1
$f(x)$	3	12	15	-21

- (d) Use Simpson's three-eighth rule to evaluate $\int_0^1 \frac{dx}{1+x+x^2}$ by taking $h = \frac{1}{8}$. 3

3. Attempt any three parts of the following. Q.3(a) is Compulsory.

(a) Solve:

$\frac{dy}{dx} = 2x + y^2, \quad y(0) = 1$ by Picard's method and find value of $y(1)$.

(b) Solve:

$\frac{dy}{dx} = xy, \quad y(0) = 1, h = 0.1$ to find $y(0.4)$ using Euler's method.

(c) Solve: $\frac{dy}{dx} = x + y^2, \quad y(0) = 1$ to find $y(0.1)$ by using Runge-Kutta method of order four.

(d) Solve: $a_r + 6a_{r-1} + 9a_{r-2} = 3, a_0 = 0, a_1 = 1$.

4. Attempt any three parts of the following. Q.4(a) is Compulsory.

(a) The income of 10000 persons was found to be randomly distributed with mean Rs. 750 per month and standard deviation Rs.50. How many persons had their income exceeding Rs.668 and how many had income exceeding Rs.832. Given area for $z=1.64$ is 0.4495.

(b) Five coins are tossed 3200 times. Find the probability of getting 5 heads 25 times using Poisson's distribution.

(c) If two regression lines are $20x - 9y = 107$ and $4x - 5y = -33$,
and variance of $x = 9$, find r and σ_y .

(d) Calculate Kelly's coefficient of skewness from table:

Marks obtained	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	3	8	9	14	16	18	8	4

M.C.A. 1st Year

Even Semester Examination 2016-2017

OBJECT ORIENTED PROGRAMMING USING C++

Time: 3 hrs

Max. Marks: 40

Note: Attempt all questions. Each question carries equal marks.

Q.1 Attempt any three of the following Q.1(a) is compulsory.

- (a) Write a function in C++ that accepts n as a parameter and print a circular matrix of order nxn. A circular matrix of order 3x3 is-

$$\begin{matrix} 1 & 2 & 3 \\ 8 & 9 & 4 \\ 7 & 6 & 5 \end{matrix}$$

✓ 1/2 (0.5)

X 

4

3

3

- (b) Object oriented programs are easy to maintain". Justify.

✓ 1/2 (3)

- (c) Write a C++ program for a matchstick game being played between the computer and a user.

Your program should ensure that the computer always wins. Rules for the game are as follows:

- There are 21 matchsticks.
- The computer asks the player to pick 1, 2, 3, or 4 matchsticks.
- After the person picks, the computer does its picking.
- Whoever is forced to pick up the last matchstick loses the game.

✓ (0.5)

X

3

✓ 1/2

3

- (d) Consider an array with all its element either positive or negative values. Write a C++ function that accepts two parameters, pointer to first element and array size of mentioned array and rearrange the array in such a way that all element with negative value are place in left and positive value in right of array. For example: Consider an array of size 5 with values [2, -1, 1, -4, 6]. After rearrangement, array should look like [-1, -4, 1, 2, 6].

Q.2 Attempt any three of the following Q.2(a) is compulsory.

- (a) Define a class Book to represent a book in a library that includes following members:

4

Data Members:

BookNumber, BookName, Author, Publisher, Price, NoOfCopies, NoOfCopiesIssued

X

Member Functions:

- To Assign initial values.
- To issue a book after checking for its availability.
- To return a book.
- To display book information.

✓ 1 (3)

✓ 9.5

4

3

3

3

- (b) Differentiate the following terms

- Constructor and Member Function
- Friend Function and Member Function

✓ 1/2 (3)

✓ (3)

- (c) What are the various types of constructor? Give an example for each. Whether constructors could be overloaded?

✓ 1/2

✓ 2.5

(d) Write a C++ program using a member function to get student details (rollno, name and marks of five subjects). Introduce a friend function to calculate and print percentage of marks.

Q.3 Attempt any three of the following Q.3(a) is compulsory.

(a) Create a class Complex to represent a complex number. Overload binary operators +, - and * for perform addition, subtraction and multiplication of complex numbers. 1/2 0 4

(b) Explain following type conversions with example-

- Basic data type to Class type
- Class type to Basic data type

(c) What is inheritance? Explain following types of inheritance with example- 2 1/2 3 3

- Single Level Inheritance
- Multiple Inheritance

(d) Consider the following programs and answer the below questions- 2 1/2 3 3

class Trainer{

char TNo [5], TName [20], Specialisation [10];

int Days;

protected :

float Remuneration;

void AssignRem (float);

public :

Trainer () ;

void TEntry () ;

void TDisplay () ;

};

2.6

class Learner{

char Regno [10], LName [20], Program [10];

Protected :

int Attendance, Grade;

public:

Learner () ;

void LEntry () ;

void LDisplay () ;

priv. part.

class Institute : public Learner, public Trainer{

char ICode[10], IName [20];

public:

Institute () ;

void IEntry () ;

void IDisplay () ;

};

- Which type of Inheritance is depicted by the above example?
- Identify the member function(s) that cannot be called directly from the objects of class Institute from the following with reasons

TEntry()

LDisplay()

IEntry()

iii. Write name of all the member(s) accessible from member functions of class Institute.

iv. If class Institute was derived privately from class Learner and privately from class Trainer, then, name the member function(s) that could be accessed through Objects of class Institute

Q.4 Attempt any three of the following Q.4(a) is compulsory.

(a) A file contains a list of telephone numbers in the following form: 0 - 2nd 2nd 8 4

John 2895612356

Manish 9876895689

.....

The names contain only one word and names and telephone number separated by white spaces. Write a program to read the file and output the content of file on console.

(b) Differentiate the following terms-

- Overloaded Functions and Function Templates
- Class Template and Template Class

0.5

0.5

iii. Macro and Template.

Write a program in C++ to add, subtract, multiply and divide two numbers using class template.

1/2

3

Assuming that a text file named FIRST.TXT contains some text written into it, write a function named vowelwords(), that reads the file FIRST.TXT and creates a new file named SECOND.TXT, to contain only those words from the file FIRST.TXT which start with a lowercase vowel (i.e., with 'a', 'e', 'i', 'o', 'u'). For example, if the file FIRST.TXT contains "Carry umbrella and overcoat when it rains" Then the file SECOND.TXT shall contain "umbrella and overcoat it"

3

Q1. Attempt any 3 of following. Q1(a) is compulsory.

- (a) Categorize the various Data Structures and write down their applications. Which operations are generally performed on these data structures? In how many ways a Data Structure can be implemented?
- (b) Define Sparse Matrix and its types using suitable examples. Which precautions should be taken while making programs with sparse matrices?
- (c) How polynomials are represented using an array as well as using a Linked List? Write the algorithm for the polynomial addition using linked list.
- (d) Why algorithms are needed? Write down its significance. What do you know about complexities of an algorithm? Which notation is used to represent the time complexity? How time complexity for constant time algorithm and linear time algorithm is shown using that notation?

Q2. Attempt any 3 of following. Q2(a) is compulsory.