Paper Code	MCA-108

Roll No.	2	0	1	7	0	2	4	1	5	8

MCA

Even Semester (Sem.-II)

Minor Examination 2017-2018

Information Security and Cyber Law

Time: 2 hrs **Max. Marks: 30**

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

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

(a) The following is a dump of an IP header in octal format. 4

4076	0530	0000	4000	7406	1612	1111	0726	5432	4655
7625	1233	0623	7543	3651	7004	0007	6324	2341	2342

What is the value of following fields of IP packet?
1. Total length of IP packet.
2. Protocol related to this packet.
3. Destination IP address.
4. Checksum.
5. Flags
6. Data

(b) What do you mean by computer security? How cyber security is different from network security? 3

(c) What is difference between connection less and connection-oriented communication? How TCP protocol is different from IP protocol. Draw the TCP header format. 3

(d) Differentiate the following: 3

i) threat vs attack ii) worm vs virus iii) Internet vs WWW

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

(a) Security related to information system referred to the policies, programs, procedure and technical measure in order to avoid unauthorized access, modification, theft or physical damage s of computers, software, hardware, information and data. Baghel is the CIO of a company with network configuration shown in figure 1. The company's firewall consists of a multi-homed bastion host H that also serves as the web server, and a packet-filtering router R1 on the Internet side. H is configured to allow no in-bound connections from the Internet to the internal network, although outbound connections from internal users to the Internet are permitted. The web server contacts some internal databases and ERP applications. Baghel has recently rolled out a number of new web service applications that are popular with his customers and with the added load; his engineers have detected performance problems on H. Baghel has decided to add a separate web server to her configuration to relieve H of this load. His engineers disagree about where the new server should be placed. Four possibilities are shown in figure1. The web server could go (1) outside of the area controlled by R1, (2) between R1 and H, (3) parallel to H with a connection to both networks, or (4) between H and the internal network. 4

CH-107

06

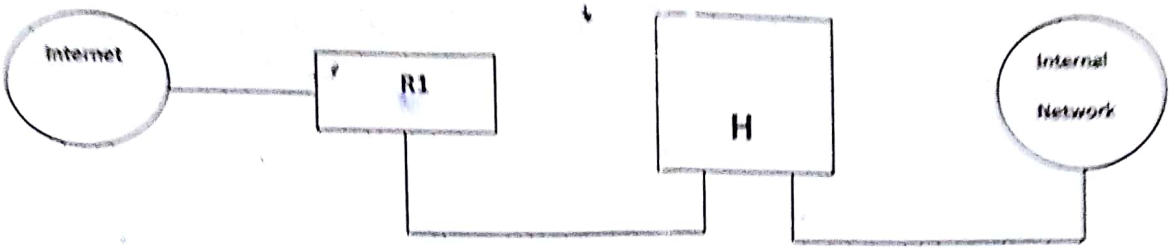

Figure 1: Network configuration

i) Describe what the impact would be of each of the four options on the security of the web server and of Baghel's internal network as a whole. Which option do you recommend?

ii) What are the possible threats the organizational information system can faces?

(b) What is the maximum number of subnets in class A using mask 255.255.192.0 and, also find the mask that create 62 subnets in class B. Find the range of addresses in blocks 200.17.21.128/27. 3

(c) Differentiate the following: 3

i) switch vs hub ii) router vs gateway iii) router vs modem

(d) What is subnetting and super netting in IP addressing? Find the class, host id and net id of an IP address: 220.34.8.9. 3

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

(a) Write a single cryptographic procedure which ensure confidentiality, integrity as well as entity authentication of a message. Describe and show each step with diagram. 4

(b) What are the problems in IPv4 address protocol? How these are removed in IPv6 address protocol? For subnet mask 255.255.224.0 used in class A, find the number of 1s that define the subnet. 3

(c) What is confidentiality, integrity and availability? Name the related attacks from which they protect your information systems. Also write a cryptographic procedure that ensure the confidentiality of a message. 3

(d) What are the advantages of classless addressing over classful addressing? What are the various types of information systems? Classify the information and discuss their roles. 3

MBA - 101 Roll No. 1 6 1 7 6 2 4 1 5 4

MCA

Second Semester

Minor Examination 2017-18

Subject Name: Fundamentals of Management

Time: 2 Hrs. **Max. Marks 30**

Note: Answer all questions.

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

(a) Define the term 'Management'. And write its objectives.

(b) Discuss the silent features of Management.

(c) Explain the different principles of Organizing.

(d) Write the different steps of Planning Process.

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

(a) Management is an art or a Science?

(b) Explain the different levels of Management and its major functions.

(c) Write the short notes evolution of Management Thought.

(d) Explain the 14 principles of management given by Henry Fayol.

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

(a) Explain the functions of Management.

(b) Explain the meaning of Planning and its types.

(c) What did you mean by Organizing? State the importance of Organizing.

(d) Differentiate between formal and informal Organisation.

MCA-106

Roll No. 2 0 1 7 0 2 4 1 5 4

M.C.A.
EVEN SEMESTER
MINOR TEST 2017 - 2018

OPERATING SYSTEM CONCEPTS

Time: 2 Hrs. **Max. Marks: 20**

Note: Answer all questions.

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

(a). Discuss each of the following unconventional page replacement schemes in the context of virtual storage multiprogramming system servicing both batch and interactive users: 4

(i) "Global LIFO"- The page brought into real storage most recently is replaced.

(ii) "Local LIFO"- The page brought in most recently by the process which requested the incoming page is replaced.

(iii) "Tired Page"- The most heavily referenced page in the system is replaced. (Consider both the global and local variants of this scheme.)

(iv) "Battered Page"- The most heavily modified page in the system is replaced. (Consider both the global and local variants of this scheme.)

(b). What are the various services of an operating system? Explain any one in brief. 2

(c). A system is overloaded system if its capacity to perform work is smaller than the work directed at it; otherwise, it is an under loaded system. The following policy is proposed to improve the throughput of a batch processing system: Classify jobs into small jobs and long jobs depending on their CPU time requirements. From separate batches of short and long jobs. Execute a batch of long jobs only if no batches of short job exist. Does this policy improve the throughput of batch processing system that is : (i) under loaded , (ii) overloaded? 2

(d) Explain Spooling with suitable diagram. You are required to write its achievement over exiting system. 2

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

(a). Consider the following reference string: 4

1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2

Find the number of page faults for optimal page replacement algorithm for 3 page frames. (Assume initially all page frames are empty)

(b). What is the cause of Thrashing? How does the system detect Thrashing? Explain. 2

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MCA

EVEN SEMESTER

Minor Examination 2017-2018

Introduction to Database Management System

Time: 02 Hrs | Max. Marks: 20

Note: Attempt all questions. Be precise in your answer

1) Attempt any **Three parts** of the following Q. 1(a) is compulsory.

(a) Draw the three-level architecture of DBMS and explain its various components in detail. 4

(b) What is the significance of Database language in DBMS? Describe the various database languages along with their applications. 2

(c) What is Data Model? Describe the Hierarchical Data Model 2

(d) Bring six differences between Database system and File system. 2

2) Attempt any **Two parts** of the following Q. 2(a) is compulsory.

(a) Draw the overall structure of DBMS and explain its various components. 4

(b) Draw the E-R diagram of Course registration process of students in MMMUT. Also, convert the E-R diagram into relational schema/tables. 2

(c) Define the terms Generalization, Specialization and Aggregation with a suitable example. 2

3) Attempt any **Two parts** of the following Q. 3(a) is compulsory.

(a) Define the terms Primary Key, Super Key, Candidate key, Alternate Key, Composite Key and Foreign Key with a suitable example. 4

(b) What is relational Algebra? Describe the various set-oriented operations of Relational Algebra. 2

(c) Create the following relational schema in SQL and answer the following queries in SQL: 2

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.

(iii) Find the names of all employees in the database whose salary falls between 40,000 and 60,000 per month.

Subject Code: MCA-105

Roll No. 2 0 1 7 0 2 4 1 5 4

M.C.A.
EVEN SEMESTER
MINOR TEST 2017 - 2018

Subject Name: Object Oriented Programming using C++

Time: 2 Hrs. Max. Marks: 20

Note: Answer all questions.

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

(a). Write a C++ function that accepts a number of lines as a parameter and prints the Fibonacci triangle. e.g. Fibonacci triangle of length 5 is 4

```
1
1    2
3    5    8
13   21   34   55
89   144  233  377  610
```

(b). Write a C++ function that rotates 90 degree clockwise a two-dimensional square array. e.g. if initial array is 2

```
11 22 33
44 55 66
77 88 99
```

After transformation the array will be-

```
77 44 11
88 55 22
99 66 33
```

(c). Design a class *Date* in C++ having three private data members day, month and year, a default and parameterize constructor to initialize above data members and a method *getDay()* to print the day of date. e.g. If the date is 12-02-2018 then it should print Monday. 2

(d) A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher, and stock position. Whenever a customer wants a book, the sales person inputs the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed. If it is, then the system displays the book details and requests for the number of copies required. If the requested copies are available, the total cost of the requested copies is displayed, otherwise the message "Required copies are not in stock" 2

is displayed. Design a class *books* in C++ with suitable member functions and constructors. Use new operator in constructors to allocate memory space required.

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

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

(b). Write a function in C++ that accepts *N* as parameters and returns the sum of following series upto *N* terms- 2

199, 195, 191, 187, 183,.....

(c). Define the following object-oriented programming concepts- 2

I. Inheritance
II. Encapsulation
III. Polymorphism
IV. Class

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

(a). Design a class *RationalNumber* that emulates a rational number *p/q* (where q! =0) with a suitable constructor and member functions *add(), subtract(), divide()* and *multiply()* that find sum, difference, division and product of two rational number. 4

(b). Design a class *Pattern* in C++ that have a private data member *n*, a constructor to initialize *n* and a method *printPattern()* which print the following pattern upto *n-levels*. e.g. if the value of *n* is 4 the pattern will be printed as- 2

```
    0
  0 1 0
0 1 2 1 0
0 1 2 3 2 1 0
```

(c). Differentiate the following terms in brief- 2

I. Constructor and Destructor
II. General Function and Member Function
III. Structure and Class

MCA

EVEN SEMESTER

Minor Examination 2017-2018

Data Structures & Applications

Time: 02 Hrs Max. Marks: 30

Note: Attempt all questions. Be precise in your answer

1) Attempt any **Three parts** of the following Q. 1(a) is compulsory.

(a) What do you understand by the term algorithm? Explain in detail. Write an algorithm for finding second largest element from a list of integers containing n elements.

(b) One of the way to use binary search on random list is to sort it and then use binary search on sorted list. Is it good idea? Give your answer with proper justifications.

(c) Write the algorithm for infix to postfix conversion of an expression. Trace your algorithm on the given expression

A*B/C-D*E+F

(d) Write a program in C to check whether the given string is palindrome or not with the help of a Stack.

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

(a) What are the parameters to judge the efficiency of an algorithm? Discuss the scenario in which these parameters play a significant role. Calculate the running time of the following code fragment.

```
for(i=0;i<n;i++)
for(j=i;j>-1;j--)
{//function definition}
```

(b) Write a program in C to count total number of elements which are less than the average of numbers in an array containing M elements. Calculate the total number of steps executed while running the program.

(c) Following statement shows an instance of function call in a C program

rep_ll(head, 5, 9);

where head holds starting address of a linked list, second integer 5 denotes the 5^{th} node and third value 9 denotes that value of 5^{th} node will be replaced by 9. Now write the definition of the above function in C.

(d) Write pseudo-code to add two polynomials stored in linked list.

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

(a) What is recursion? How recursion is evaluated by compiler? What is the significance of using recursion? Justify your answer by taking a suitable example.

(b) Implement queue data structure using array.

(c) Write a recursive function to multiply two numbers. Trace your algorithm and show each step in multiplying two numbers 3 and 4.

(d) Write a complete program in C to perform push and pop operation on stack implemented through linked list.

Minor Test - MCA (2nd Semester)

Applied Computational Methods (BAS-24)

Time = 2 Hrs. Max. Marks = 30

Note: Attempt all questions. Attempt any THREE parts including part (a) which is compulsory in each question.

1. (a) Find one positive root between 1 and 2 of equation $x^3 - x - 1 = 0$ correct up to 4 decimal places using bisection method. (4)

   (b) Solve $x^3 - 5x + 3 = 0$ by Regula Falsi Method to find a root between 0 and 1. (3)

   (c) Find interpolation polynomial $f(x)$ using Newton's Divided Difference method for the following table: (3)

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

   (d) Using Lagrange's method find $f(x)$ from table given below: (3)

x	1	2	4
$f(x)$	4	13	73

2. (a) Solve $x^4 - x + 3 = 0$ to find a root between 1 and 2 by Newton-Raphson method. (4)

   (b) Solve, using Crout's method, the following system of equations: (3)

$$2x - 6y + 8z = 24;$$
$$5x + 4y - 3z = 2;$$
$$3x + y + 2z = 16.$$

   (c) Solve by Gauss Siedel method: (3)

$$3x + 10y + z = 14;$$
$$10x + y + 2z = 13;$$
$$2x + 3y + 10z = 15.$$

   (d) Find the cube root of 51 using Newton-Raphson method. (3)

3. (a) Find the values of $f(2.5)$ and $f(4.25)$ from the table given below: (4)

x	2	3	4	5
$f(x)$	2.6	3.5	4.8	7

   (b) Find interpolating polynomial using Newton's Divided Difference method from the following table: (3)

x	3	7	9	10
$f(x)$	168	120	72	63

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

   (d) Apply Lagrange's formula to find $f(x)$ from the following table: (3)

x	1	3	8
$f(x)$	5	16	31