MCA-103

Roll No. 2 0 1 7 0 2 9 1 1 2

MCA (Ist Sem)
ODD SEMESTER
Minor Test 2017-2018

Computer Organization and Architecture

Time: 02 Hrs

Max. Marks: 30

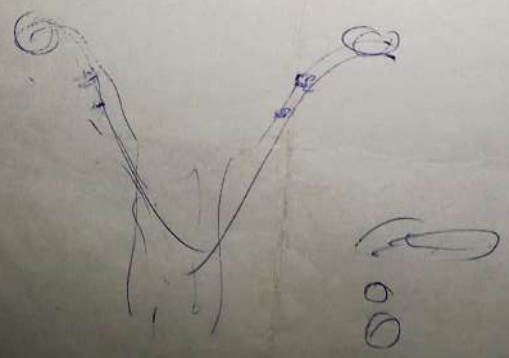
Q.1	Attempt any **Three parts** of the following Q. 1(c) is compulsory			
a	Find the value of x in the following:			
	(i)	$(653)_7 X (523)_7 = (x)_7$	(ii)	$(D6C.5B)_{16} = (x)_4$
	(iii)	$x = (11010)_2 - (1101)_2$ subtract using 2's complement.	(iv)	$(21340)_5 = (x)_{10}$
b				
	(i)	Prove that (A+B'+AB)(A+B')(A'B) = 0.		
	(ii)	Implement the Boolean function F = A'B'C + A'BC'+A'C' with NAND gate only.		
	(iii)	Reduce the following Boolean to required number of literals. (w + y + z) (w + y + z') (w + y + z) (w + x') to four literals.		
c		Design a 4 bit carry look ahead generator with suitable diagram.		
d	(i)	Draw the logic diagram of a 2 to 4 line decoder with only NAND gates. Include an enable input		
	(ii)	A combinational circuit is defined by the following three functions: F1 = x'y' + xyz' F2 = x' + y F3 = xy + x'y' Design the circuit with a decoder and external gates.		
Q.2	Attempt any **Three parts** of the following Q. 2(d) is compulsory			
a	Convert the decimal number 125.25 to base 3, base 4, base 6, base 7, base 8, base 9, base 11, base 16.			
b	Design a combinational circuit that accept a three bit number and generates an output binary number equal to the square of the input number.			
c	(i)	Implement a Full subtractor with two half subtractor and an OR gate.		
	(ii)	Minimize the given Boolean function using K- map and implement the simplified function using NAND gates only. F(A,B,C,D) = ∑m(0,1,2,3,7,8,10) + d(5,6,11,15)		
d	(i)	Obtain the simplified expression in (i) Sum of products (ii) Product of sums: (A' + B'+D)(A'+D')(A+B+D')(A+B'+C+D)		
	(ii)	Simplify the Boolean function f using the don't care condition d in (i) sum of products (ii) product of sums: F = w'(xy' + xy' + xyz) + x'z'(y + w) d = w'x(y'z + yz') + wyz		
Q.3	Attempt any **Three parts** of the following Q. 3(a) is compulsory			
a	Design a BCD to decimal decoder using the unused combinations of the BCD code as don't care conditions.			
	(i)	Construct a 32x1 multiplexer with 4x1 multiplexers. Use block diagrams.		

	(ii)	Implement full adder with the help of (I) NAND gates (II) NOR gates.
c	(i)	Design a 4-line to 2-line priority encoder. Include an output E to indicate that at least one input is a 1.
	(ii)	Implement the following functions using a 4-to-16 line decoder $F(A,B,C,D) = \sum (1, 2, 4, 7, 8, 11, 12, 13)$
d		Implement the following functions with (I) 16:1 MUX (II) 8:1 MUX (III) 4:1 MUX :- $F(A,B,C,D) = \sum (0, 2, 3, 6, 8, 9, 11, 12, 14)$

full Subtractor with Multiplexer

with two Half Subtractor

Convert grey code into 4bit binary number implementing XNOR?



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

MCA-105

M.C.A.
EVEN SEMESTER
MAJOR EXAMINATION 2017 - 2018

OBJECT ORIENTED PROGRAMMING WITH C++

Time: 3 Hrs. **Max. Marks: 50**

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

1. Attempt any five parts of the following: **(5× 2 = 10)**

(a) Write a C++ function that accepts a number *N* and finds the smallest number not less than *N*, which has all digits even. e.g. if *N* = 1345 then output is 2000 as it has all digits even.

(b) Write a C++ function that accepts two coordinates of a line as *(x1, y1)* and *(x2, y2)*, find if the line passing through these points also passes through origin or not.

(c) Write a C++ function that accepts *a* and *N* and find out sum of first *N* terms of following series-

$$a + a^2 + a^3 + a^4 + a^5 + \ldots\ldots\ldots\ldots\ldots\ldots$$

(d) Design a Class *Matrix* in C++ that has data members to represent a matrix and a function that displays the sum of all elements of middle row and middle column of matrix.

(e) Design a class Fibonacci in C++ function that has a data member *N*, suitable constructor to initialize it and a method *printFibonacci()* that prints *N* terms of Fibonacci series in reverse order e.g. if the value of N is 5 then it should print 3 2 1 1 0.

(f) Why constructor is important in object-oriented programming? Explain various types of constructor used in C++ with example.

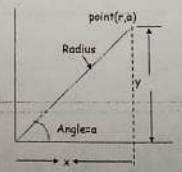
(g) Design a class *Pattern* in C++ that has a data member *num*, a suitable constructor to initialize it and a method *printPattern()* to print the following pattern upto level *num*.

```
111111111
2222222
33333
444
5
```

2. Attempt any two parts of the following: **(2× 5 = 10)**

(a) What is inheritance? Explain various types of Inheritance with implementation in C++.

(b) Design a class *Polar* in C++ which describes a point in the plane using polar coordinates radius and angle. A point in polar coordinates is shown below



Overload + operator using friend function to add two objects of Polar. Note that we cannot add polar values of two points directly. This requires first the conversion of points into rectangular coordinates, then adding the respective rectangular coordinates and

finally converting the result back into polar coordinates. You need to use the following trigonometric formula:

$$x = r\cos\theta \quad y = r\sin\theta \qquad \theta = \tan^{-1}(x/y) \quad r = sqrt(x^2 + y^2)$$

Also define a class *Rectangle* to represent points in rectangle systems. Use type conversion to convert from *Polar* to *Rectangle* and vice-versa.

(c) Design a class *Matrix* in C++ to represent a matrix and overload operator *, + and – using friend function to perform multiplication, addition, and substation of two matrices.

3. Attempt any two parts of the following: **(2× 5 = 10)**

(a) Consider the following C++ code and answer the below questions-

```
class Exterior
{
        int OrderId;
        char Address[20];
        protected:
                float Advance;
        public:
                Exterior();
                void Book();
                void View();
};
```

```
class Paint : public Exterior
{
        int WallArea,ColorCode;
        protected:
                char Type;
        public:
                Paint();
                void PBook();
                void PView();
};
class Bill : public Paint
{
        float Charges;
        void Calculate();
        public:
                Bill();
                void Billing();
                void Print();
};
```

I. Which type of Inheritance is illustrated in the above example?
II. Write the names of all the data members, which are directly accessible from the member functions of class Paint.
III. Write the names of all the member functions, which are directly accessible from an object of class Bill.
IV. What will be the order of execution of the constructors, when an object of class Bill is declared?
V. If class Bill was derived privately from class Paint, then name the member that could be accessed through object of class Bill.

(b) What is type conversion? Explain its various types. Use type conversion to convert class *Array* that represent an array to basic data type. The value of basic data type after conversion is the number of prime elements in array. e.g. if the array contains [2,5,9,10,7], then basic data type will hold value 3 as there are three prime number in array.

(c) What is virtual base classes in C++? Explain it with the help of example. What is the order of constructor calling in case of virtual inheritance?

4. Attempt any two parts of the following: **(2× 5 = 10)**

(a) Write a program in C++ that reads number written on *Num.txt* to initialize an array and sort it. After sorting, it writes sorted array on file *sort.txt*.

(b) What are the various file modes in C++? Write a program in C++ to read a file *temp.txt* and find out number of palindrome words available in file *temp.txt*.

MCA-105

Roll No 2 0 1 8 0 2 4 0 3 3

MCA, 2nd Sem
Major Examination 2018-19
Object Oriented Programming with C++

Time: 3hrs *Marks: 50*

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

Q1. Attempt any 5 parts of the following.

(a) Can a copy constructor accept an object of the same class as parameter instead of reference of the object? For a class MyClass { }; what default methods will the compiler generate? 2

(b) What are the advantages of using new operator as compared to the function alloc( )? 2

(c) Write a program to find Maximum out of two numbers using friend function. Note that here one number is a member of one class and the other number is member of some other class. 2

(d) Write a program to swap private data members of classes named as ABC and XYZ using friend function. 2

(e) Write an object oriented program which accepts days as integer and displays total number of years, months and days in it. 2

(f) Write a C++ program to demonstrate the usage of static data member and static member function. 2

(g) Write an object oriented program to calculate the total expenses. Quantity and price per item are input by the user and discount of 10% is offered if the expense is more than 5000. 2

Q2. Attempt any 2 parts of the following.

(a) Write a function called hms_to_secs( ) that takes three int values - for hours, minutes, and seconds - as arguments, and returns the equivalent time in seconds (type long). Create an object oriented program that exercises this function by repeatedly obtaining a time value in hours, minutes, and seconds from the user (format 12:59:59), calling the function, and displaying the value of seconds it returns. 5

(b) Write an object oriented program to design a class complex to represent complex numbers. The complex class should use an external function (use it as a friend function) to add two complex numbers. The function should return an object of type complex representing the sum of two complex numbers. 5

(c) Write an object oriented program to create a bank account and provide a user id and password to the account holder who can login using his credentials. If login is successful then user should be able to do the following: 5

i. Deposit money
ii. Withdraw money
iii. Display the balance.

Q3. Attempt any 2 parts of the following.

(a) Differentiate between following using suitable code: 5
   i. Multilevel inheritance and multiple inheritance
   ii. Hierarchical inheritance and hybrid inheritance

(b) Write a program illustrating the use of virtual functions in class. What are the implications of making a function pure virtual? 5

(c) What is meant by function overloading? Write down a suitable code. Why it is also known as function polymorphism in object oriented programming? 5

Q4. Attempt any 2 parts of the following.

(a) What are the main advantages of passing arguments by reference? Give function prototype of a function fun( ) which is having two objects of class ABC as arguments and returning reference of an object as parameter. 5

(b) What is an Exception? Explain the terms try, throw and catch with appropriate example? What should be placed inside these blocks? Give an appropriate example. 5

(c) What are the advantages of using-exception handling mechanism in a program? What happens when a function throws an exception that was not specified by an exception specification for this function? Explain using suitable example. 5

Q5. Attempt any 2 parts of the following.

(a) List at least three new operators added by C++ which supports the object oriented programming. Explain the application of the scope resolution operator in C++ by giving an appropriate code. 5

(b) What are the benefits of operator overloading? Write a C++ program to overload + operator to add two matrices and = = operator to compare two strings. 5

(c) Write a program for developing a matrix class which can handle integer matrices of different dimensions. Also overload the operator for addition, multiplication and comparison of matrices. 5

MCA-105

Roll No 2 0 1 7 0 2 4 1 1 2

MCA, 2nd Sem
Major Examination 2018-19 (Summer Term)
Object Oriented Programming with C++

Time: 3hrs *Marks: 50*

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

Q1. Attempt any 5 parts of the following.

(a) Define constructors and destructors. How they are invoked? Why do we need to write a destructor? How are they written? 2

(b) Explain type of constructors using suitable examples. Can we have more than one constructor or destructor in a class? 2

(c) Can we access private members through objects? If your answer is yes then write down the suitable code and if it is no then write down the other ways for accessing private members using appropriate examples? 2

(d) Define inline functions. Why do we need inline functions? Write down a code in C++ to show the use of inline function. 2

(e) How friend functions are written in C++? Write down a C++ code to explain the use of friend functions. 2

(f) Write down the various characteristics of object oriented programming? How are they implemented in C++? 2

(g) What are various object oriented programming languages? Differentiate between any two object oriented programming languages. 2

Q2. Attempt any 2 parts of the following.

(a) Write an object oriented program to calculate the total fee to be deposited by a student in summer term when the user inputs the number of subjects. Maximum two subjects are allowed to be registered in summer term with fee of Rs 12000/- per subject and additional late fee of Rs 3000/- has to be charged if registration is done by the student after the due date. 5

(b) Write an object oriented program to create an attendance management model for students and provide a user id and password to the student who can login using his credentials. If login is successful then the user should be able to see the attendance. 5

(c) Write a program to find smallest of two numbers using friend function. Note that here one number is a member of one class and the other number is member of some other class. 5

Q3. Attempt any 2 parts of the following.

(a) Define Inheritance and its types using suitable diagrams and code fragments. How inheritance contributes to the object oriented programming? Can we inherit private members? Justify your answer. 5

(b) What is meant by polymorphism? Explain its types. Differentiate between function overloading and operator overloading by giving suitable examples. 5

(c) What do you mean by virtual function? What is its significance? What are the implications of making a function pure virtual? 5

Q4. Attempt any 2 parts of the following.

(a) What is the significance of exception handling in object oriented programming? What happens when a function throws an exception that is not specified? 5

(b) What do you know about exception handling? Explain the terms try, throw and catch with appropriate example? 5

(c) Can we pass an object as parameter of a function and return an object through the function? Give the suitable example to justify your answer. 5

Q5. Attempt any 2 parts of the following.

(a) Differentiate between compile time and run time polymorphism. Write a C++ program to show the use of function overloading for addition operation. 5

(b) What are the advantages of operator overloading? Write a C++ program to overload + operator to add two 2D arrays of integer types. 5

(c) Which operators cannot be overloaded and why? Explain the application of the scope resolution operator in C++ by giving an appropriate code. 5

MCA-111

Roll No. 2 0 2 1 1 0 4 0 3 2

MCA, 1st Sem.

Major Examination 2021-22

Object Oriented Programming with C++

Time: 3hrs *Marks: 50*

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

Q1. Attempt any 5 parts of the following.

(a) Differentiate between virtual function and virtual class. 2

(b) What are the different memory allocation and deallocation methods in C++? 2

(c) Write down a C++ program to multiply two matrices. 2

(d) Write a C++ program to generate Fibonacci series using recursion. 2

(e) Write down a C++ program to check whether an input number is Prime or not. 2

(f) Write down a C++ program to check whether an input number is Armstrong or not. 2

(g) Write an object oriented program in C++ to check whether an input string is palindrome or not? 2

Q2. Attempt any 2 parts of the following.

(a) How can we access a private member of any class? What is the difference between an inline function and a friend function? Why do we require these functions? Write down C++ program to show the use of these functions. 5

(b) How do we denote the constructors and destructors in a C++ program? What are the types of constructors in C++? Explain using suitable examples. When are they invoked? Write a program in C++ to show their order of invocation. 5

(c) Which type of class members can be inherited and how? Can we inherit a private member of any class? Explain different types of Inheritance in C++ using suitable figures and code fragments. 5

Q3. Attempt any 2 parts of the following.

(a) Give a taxonomy to represent the types of Polymorphism in C++. Which operators cannot be overloaded and why? Write down a program in C++ for addition of two complex numbers using operator overloading. 5

(b) Differentiate between function overloading and function overriding. Which of them is archived at compile time and which is archived at run time? Write down C++ codes to show both of these concepts. 5

(c) How overloading of a unary operator with member function is different from overloading it with friend function? Write down the suitable C++ codes for these two methods of operator overloading to justify your answer. 5

Q4. Attempt any 2 parts of the following.

(a) How does Abstract Base Class help any programmer? Differentiate between Abstract and Concrete classes? Can we instantiate an abstract class? Write down a C++ code for overriding an abstract method. 5

(b) In file handling, why should we always close the files after their use? Explain the sequential and random-access file operations. Write a C++ program to count a specified word 'the' within a text file MCA.txt. 5

(c) Describe the C++ stream classes structure using a suitable diagram. Which library holds all the stream classes in the C++? How does the standard streams work for input and output? 5

Q5. Attempt any 2 parts of the following.

(a) What is the need of Templates? How do they work? Differentiate between Function Template and Class Template using suitable examples. Write a C++ program for adding two floating point numbers using function templates. 5

(b) Explain the benefits of exception handling. Write a C++ program for exception handling. This code should have a try and a catch block to process the arithmetic exception generated by division-by-zero error. 5

(c) How Exception Handling is done in C++? Differentiate between the Synchronous and Asynchronous Exceptions. Keyboard interrupts and disc failure comes under which type of exception? 5

MCA-101

Roll No 20 17 0 24 1 2 2

MCA, 1st Sem
Minor Test 2018-19
Computer Programming with C

Time: 2hrs *Marks: 20*

Note: Attempt all questions.

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

(a) Write a C program which reads the values of three variables (a, b and c) and then rotate their values such that a has the value of b, b has the value of c and c has the value of a. Now answer the following questions with reference to this program: 4

i. What is the meaning each token of the first line of your program?
ii. Can we declare the variables at any place in the code? Why?
iii. Which type of function is main( ) whether user defined or predefined?
iv. Why there is no effect to your output whether we write any return type with main( )?

(b) Explain following terms in short: 2
i. Language Processors and their types
ii. Operating System and their functions

(c) Write a program in C to print Fibonacci Series (5 terms). This program should also print the sum of this Fibonacci Series. 2

(d) Write a program in C to print following pattern: 2

```
3
6   6
9   9   9
```

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

(a) Explain token and its types. What are the rules for creating an identifier? For the statement given below, draw a table which should have information regarding the type of token and the number of tokens in each category: 4
C=A*B+5;

(b) Write a program in C which converts any character into its ASCII code and vice versa (in the same program). Do you expect any problem while implementing this code? If yes, then mention the problem and explain how this problem could be resolved? If No, then mention why you are not expecting any problem? 2

(c) Define typecasting? What are the basic rules for type conversion? Differentiate between coercion and casting with appropriate examples. 2

Q3. **Attempt any 2 parts of the following. Q3(a) is compulsory**

(a) What do you understand by nesting? What is the effect of Nesting on time complexity of the program? To which programming constructs, we can apply nesting? Give the suitable examples for all the possibilities. 4

(b) Write a program in C to find the smallest of three floating point numbers. Can this program be converted using only switch statement? If yes then write down the code. If no then tell the reason and propose the other approach to resolve this issue. 2

(c) Write down the outputs for following code fragments: 2

i.
```
static int i=5;
printf("%d%d%d", i+1, i++, ++i);
```

ii.
```
if (20<10);
else x= (20<10) ? printf("Twenty") : printf("Ten");
printf("%d",x);
```

iii.
```
if(printf("%d",printf("MMMUT")))
printf("\t C Programming");
```

iv.
```
int i;
for( i=3; i<30; i*=3);
printf("%d", i);
```

MCA-101

Roll No 2 0 1 7 0 2 4 1 2 2

MCA, 1st Sem.
Major Examination 2018-19

Computer Programming with C

Time: 3hrs *Marks: 50*

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

Q1. Attempt any 5 parts of the following.

(a) Why do we need an Operating System? Explain OS using an appropriate diagram? 2

(b) Classify the type of computers using a neat classification chart. 2

(c) What are the various types of monitors? Explain in brief. 2

(d) Discuss different kind of printers in short. 2

(e) What is the role of language processors? Which type of language processor is used in C programming? Write down some examples of it. 2

(f) Categorize various type of memories and explain memory hierarchy in brief. 2

(g) What are the characteristics of an algorithm? Write down the algorithm to find multiplication of the digits of a two digit number. 2

Q2. Attempt any 2 parts of the following.

(a) Write a program in C to implement following table using if statement. 5

Character	Output
R	RED
G	GREEN
B	BLUE

Convert the above program using switch statement. What are the advantages and limitations of switch statement.

(b) What do you know about entry controlled and exit controlled loops? Give examples. Write down the applications of nested loops? Write a program to find the sum of the following series (Take the inputs for x and n from user) : 5

$1-x+x^2-x^3+x^4.....x^n$

(c) Write a program to- 5

(i) check an input year whether leap year or not

(ii) print and count the leap years for the range of the years which is input by user

Q3. Attempt any 2 parts of the following.

(a) What are the applications of an Array? Write programs to 5

(i) multiply two matrices

(ii) print the transpose of an input matrix.

(b) What is the difference between **strcpy** and **strncpy** functions? Write C programs to- 5

(i) reverse a string

(ii) check a string whether palindrome or not

(c) What is the difference between- 5

(i) Structure and Array

(ii) Array within Structure and Array of Structure

Make a structure 'Book' which should have the fields as Title of the book, Author's name, ISBN Number of the book and number of pages in the book. Write a program in C which should be able to read and display these records for all the books of a library (Assume that there are 100 books in the library).

Q4. Attempt any 2 parts of the following.

(a) Define recursion and its types. What are the advantages and drawbacks of using recursion? Write down a program to find factorial of an input number using recursion. 5

(b) What do you understand by function prototype? Describe various types of function arguments by providing the suitable example. Write a function which should return ten times of the value of its argument and call it in main function (Use call by value method of function). 5

(c) What do you know about default parameter of the function? Explain using an appropriate example. Write a program in C to add two floating point numbers using passing pointers as the function argument method. 5

Q5. Describe any 2 of the following in detail:

(a) Define pointer? Explain the terms referencing and dereferencing. Name some application areas where pointers are used. Write down a simple example of pointer arithmetic. What is meaning of the statement **int** *p; 5

(b) What are macros? Write down the name of a macro which is defined in "stdio.h" and used in "File Handling" in C. Discuss the different forms of macro substitutions by giving suitable examples. 5

(c) What is EOF? Where is it defined and what is its default value? Name a predefined function which has the similar type of activity (as of EOF). Write a program in C that copies the contents of a file "ABC.txt" to the file "XYZ.txt". 5

MCA101 Roll No.

M.C.A.
(SEM I) ODD SEMESTER
MAJOR EXAMINATION 2015 - 2016

COMPUTER PROGRAMMING WITH C

Time: 3 Hrs. Max. Marks:

Note: Answer all questions.

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

(a) Discuss the different phases of Software Development Life Cycle.

(b) Explain the memory hierarchy by drawing a suitable diagram.

(c) What do you understand by software? Explain the various types of Operating System.

(d) Define algorithm. Write an algorithm to find out the longest word from a given line written in English language.

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

(a) Explain the different types of operators in detail. What do you mean by associativity and precedence of an operator?

(b) Write a program in C to sum the following series
1/2! + 2/3! + 3/4! +..... n terms where n! denotes factorial of n.

(c) Write a program in C to read a number from keyboard and print it in figure form. As for example input: 152 output: ONE FIVE TWO 3

(d) Write a program to print the following pattern 3

```
        A
      A B A
    A B C B A
```

```
A B C ... Y Z Y ... C B A
```

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

(a) What is structure? Declare a structure "emp" which has empid, name, salary and gender as fileds. Now write a program in C which takes n records as input and print the average salary of male and female employee separately. Make suitable assumptions.. 4

(b) Implement Binary Search in C. What is the limitation of Binary Search? 3

(c) Write a program in C to input name consisting of First Name, Middle Name and Last Name and print the name in following form. 3
Input: Madan Mohan Malaviya Output: M.M. Malaviya

(d) What is the significance of using recursion? Write a recursive function to multiply two numbers 3

M.C.A.
(SEM I) ODD SEMESTER
MAJOR EXAMINATION 2014 - 2015

COMPUTER ORGANIZATION & ARCHITECTURE

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. (4)

a Find the value of x in the following:

(i) $(835)_{10} = (x)_{BCD}$ (ii) $(EZB.4B)_{16} = (x)_4$

(iii). $(346)_7 \times (563)_7 = (x)_7$ (iv) $(12.354)_{10} = (x)_2$ (3)

b (i) Reduce the Boolean expression A'B (D' + C'D) + B (A + A'C D) to one literal.

(ii) Implement the Boolean function F = xy'z + x'yz'+ x'z' with NAND gate only. (3)

c Simplify the following expressions to (I) sum-of-products and (II) products-or-sums:

(i) (A + C' + D')(A' + B' + D')(A' + B + D')(A' + B + C')

(ii) C'D + ABC' + ABD' + A'B'D

d With the use of maps, find the simplest sum-of-products form of the function F =f g , where

f = abc' + c'd + a'cd' + b'cd' and

g = (a + b + c' + d')(b' + c' + d)(a' + c + d') (3)

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

a Design 4 bit carry look ahead generator. (4)

b Design a BCD to decimal decoder using the unused combinations of the BCD code as don't care conditions. (3)

c Construct a 32x1 multiplexer with only 2x1 multiplexers. Use block diagrams. (3)

d Draw the logic diagram of a 2 to 4 line decoder with only NOR gates. Include an enable input. (3)

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

a Write a program to evaluate the arithmetic statement:-

X = A+B*[C*D+E*(F+G)*H] (4)

b Using Three, Two, One and Zero address Machines.

The outputs of four register R0, R1, R2, R3 are connected through 4-1 multiplexers to the inputs of the fifth register, R5. Each register is 8 bits long. The required transfer are dictated by four timing variables t0 through t3 as follows:

T0 : R5←R0
T1 : R5←R1
T2 : R5←R2
T3 : R5←R3

Draw a block diagram showing the hardware implementation of register transfers. (3)

c Design 4-bit Arithmetic Circuit that performs Addition, Subtraction, and Increment and Decrement operations. (3)

d Design an efficient logic circuit shared by different branch conditions derived from the combination of standalone status of the Flag register bits S (sign), V (overflow), C (End carry), Z (all 0's). Specify the conditional branch instructions which can be supported by the circuit you have designed. (3)

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

a 8K x 1 RAM chips are used to construct 32K x 16 Memory. How many chips will be required? Draw the connection diagram. (3)

b A block set associative cache consists of a total of 64 blocks divided into four block sets. The main memory containing 4096 blocks each consisting of 128 words.

(i) How many bits are there in the main memory address?

(ii) How many bits are there in each of TAG, SET and WORD field? (3)

c Describe DMA with suitable block diagram. Why does DMA have priority over the CPU when both request memory transfer? Explain. (4)

d Discuss the concept and implementation of virtual memory. Also describe a suitable scheme for translation from logical address to physical address. (3)

Subject Code: MCA-105 Roll No. 2017024149

M.C.A.
SUMMER TERM
MINOR TEST 2018 - 2019

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 program in C++ that prints following pattern- 4

```
1                       1
2 2 2                 2 2 2
3 3 3 3 3           3 3 3 3 3
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
```

(b). Given student's records with each record containing id, name and age of a student. Write a C++ program to read these records and display the student's record whose age is greater than 18. 2

(c). Design a class Box in C++ with constructor overloading with following description- 2

Private Member

I. Length
II. Width
III. Height

Public Member

I. 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.

(d) What is friend function? Explain it with a suitable example. 2

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 prime number between them. 4

(b). Write a program in C++ that finds number of even and odd elements in an array. 2

(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). What are the various types of constructor? Give an example for each. Whether constructors could be overloaded? 4

(b). Define a class ComplexNumber in C++ with following description- 2

Private Members

I. Real

II. Imaginary

Public

I. 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.

II. 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.

III. 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.

IV. 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.

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

I. Constructor and Destructor

II. Structure and Class

MCA-112 Roll N0. 2 0 2 1 1 0 4 0 7 2

MCA

(SEM - I) EVEN SEMESTER

MAJOR EXAMINATION 2021-22

DATABASE MANAGEMENT SYSTEM

Time: 3Hrs. **Max. Marks: 50**

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

Q 1. Attempt any five parts of the following. **5×2 = 10**

(a) Differentiate between database system and file system.

(b) What is the significance of Data Model in database management system? Explain the Hierarchical data model in brief.

(c) Draw the E-R diagram for course registration process of a student. Convert the diagram into tables also. Assume the appropriate entity and attributes of your own.

(d) Draw the overall structure of DBMS and explain its main components in brief.

(e) What is the significance of Relational Algebra in DBMS? Describe the selection, projection and join operations of relational algebra with a suitable example.

(f) Illustrate the various aggregate functions of SQL with a suitable example.

(g) Define the concept of Super Key, Candidate Key, Primary Key and Foreign Key with a suitable example.

Q 2. Attempt any two parts of the following. **2×5 = 10**

(a) What is Functional Dependency? Describe the various Armstrong's axioms with a suitable example.

(b) What is partial functional dependency? Describe the second normal form (2NF) with a suitable example.

(c) What is the significance of Lossless Join Decomposition of a relation? Consider the relation schema, R = {A, B, C, D, E} is decomposed into relations R1 = {A, B, C} and R2 = {A, D, E}. The FDs defined over R are given by set F:
{A -> CD, B -> D, CD -> E, E -> A}. Determine whether the decomposition of R is lossless or not.

Q 3. Attempt any two parts of the following. **2×5 = 10**

(a) What is Transitive Dependency? Describe third normal form (3NF) WITH A SUITABLE EXAMPLE.

(b) Consider a relation given below:

SP (Sno, Sname, Pno, Qty). Here Sname is considered unique for each Sno. So, FDs of above relation is:

(Sno, Pno) -----› Qty, (Sname, Pno) -----› Qty, Sno -----›Sname, Sname -----› Sno.

Is this relation in 3NF? Check for it to be in BCNF?

(c) What is multivalued dependency (MVD)? Illustrate the fourth and fifth normal form with a suitable example.

Q 4. Attempt any two parts of the following. **2×5 = 10**

(a) What is Transaction? Illustrate the ACID properties of transaction. Draw a state diagram and discuss the typical states that a transaction goes through during execution.

(b) What do you mean by schedule in the context of concurrent execution of transactions in RDBMS? Describe the various types of serializability with a suitable example.

(c) What is concurrency control? Describe the two-phase locking protocol (2PL) along with its limitations.

Q 5. Attempt any two parts of the following. **2×5 = 10**

(a) How does timestamp ordering protocol work? Explain with a suitable example.

(b) What is deadlock? How is deadlock detected? Describe the wait-die and wound-wait scheme of deadlock prevention with a suitable example.

(c) What is Multiple granularity? Describe with a suitable example.

Roll No 20L80240416

MCA, 2nd Sem
Minor Test 2018-19

Object Oriented Programming with C++

Time: 2hrs *Marks: 20*

Note: Attempt all questions.

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

(a) In how many ways a member can be taken in a class? Can we access private members through objects? If your answer is yes then write down the suitable code and if it is no then write down the other ways for accessing private members using appropriate examples? 4

(b) Define inline functions. Why do we need inline functions? Write down a code in C++ to show the use of inline function. 2

(c) How friend functions are written in C++? Write down a C++ code to explain the use of friend functions. 2

(d) Define copy constructors and write down the code to print the values of the two public data members (one is of integer type and other is of float type) using copy constructors. 2

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

(a) Write down the various characteristics of object oriented programming? How are they implemented in C++? Write in short on all of them by giving appropriate example for each. 4

(b) What are various object oriented programming languages? Differentiate between any two object oriented programming languages. 2

(c) What is the use of scope resolution operator? Write down a C++ program to add any two private data members of integer type using member function and scope resolution operator. 2

Q3. Attempt any 2 parts of the following. Q3(a) is compulsory

(a) Define constructors and destructors. How they are invoked? What is the order of invocation? How constructors and destructors are different from a normal member functions? Can we have more than one constructor in a class? Define constructor overloading? **4**

(b) What is the use of parameterized constructors? Write down the code to print values of three private data members using parameterized constructors by implicit and explicit call both? **2**

(c) Why do we need to write a destructor? How are they written? Can we have more than one destructor in a class? Define default constructors and default destructors using suitable examples? **2**

Subject Code: MCA-105 Roll No. | | | | | | | | | | |

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*. 2

e.g. if the value of *n* is 4 the pattern will be printed as-

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

```
0
1
```

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

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

M.C.A.
SUMMER TERM
MINOR TEST 2018 - 2019

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 program in C++ that prints following pattern- 4

```
1                   1
2 2 2             2 2 2
3 3 3 3 3       3 3 3 3 3
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
```

(b). Given student's records with each record containing id, name and age of a student. Write a C++ program to read these records and display the student's record whose age is greater than 18. 2

(c). Design a class Box in C++ with constructor overloading with following description- 2

Private Member

I. Length
II. Width
III. Height

Public Member

I. 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.

(d). What is friend function? Explain it with a suitable example. 2

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 prime number between them. 4

(b). Write a program in C++ that finds number of even and odd elements in an array. 2

(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). What are the various types of constructor? Give an example for each. Whether constructors could be overloaded? 4

(b). Define a class ComplexNumber in C++ with following description- 2

Private Members

I. Real

II. Imaginary

Public

I. 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.

II. 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.

III. 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.

IV. 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.

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

I. Constructor and Destructor

II. Structure and Class

MCA 111 Roll no 2 0 2 1 1 0 4 4 8

MCA

ODD SEMESTER

MINOR TEST -2021-2022

OBJECT ORIENTED PROGRAMMING WITH C++

Time-2Hrs Marks-20

Note-Answer all questions

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

(a) What is the primary data type in C++, their size, range, and format? 4

(b) Explain the difference between Do While and While statement with an example. 2

(c) What are Destructors. Explain with an example. 2

(d) What is Constructor. Define different types of constructors. 2

Q2 Attempt any two parts of the following. Q2(a) is compulsory.

(a) What are derived and user defined data types in C++. 4

(b) Write a program to print prime numbers up to a given number. 2

(c) What are the differences between the object-oriented programming and procedure-oriented programming? 2

Q3 Attempt any two parts of the following. Q3(a) is compulsory.

(a) What is friend function? Write a program to swap two numbers using pass by addresses with help of friend function. 4

(b) Describe the concept static data member and static member functions with suitable example. 2

(c) What is inline function? Write down the necessity and limitation of inline function 2

Subject Code: BAS-03 Roll No

B.Pharma

SEM I ODD SEMESTER

MAJOR EXAMINATION 2021-2022

Subject Name: Professional Communication

Time: 2 Hrs. Max. Marks: 50

Note- Attempt ALL questions. Each question carries equal marks

Q1- Attempt any four parts of the following.

a) What is Communication? Discuss the process of communication. 5
b) What are the barriers of communications? Also discuss verbal and non-verbal communication. 5
c) What do you mean by parts of speech. Discuss its types and uses. 5
d) What is the importance of letter writing? Discuss its types. 5
e) What steps will you initiate to improve your English. How you will tackle hesitation and nervousness while speaking English. 5
f) What is thesis? Draw a front matter of a thesis. 5

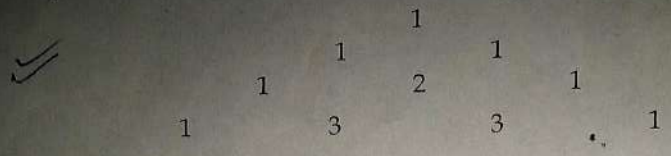
Q2- Attempt three parts of the following.

a) What do you understand by LSRW in communication? What is talk less and listen more strategy? 5
b) What are the channels of communication? Discuss in brief. 5
c) What is phrase? How it is differ from Clause. Differentiate with suitable example. 5
d) What is paragraph writing? What are the methods of different paragraph writings? 5

Q3- Attempt three parts of the following.

a) Write a letter to your power station in charge regarding frequent power cut due to bad weather. 5
b) What is scientific writing? How to it is differ from technical writing. 5
c) If you have to present a presentation in your college what preparations will you do? Discuss. 5
d) Why body language plays an important role in deciding our personality? 5

(iv) What is binary file? What are its advantages? Write a program in C++ to read numbers written on binary file *bin.out* and write the pattern corresponding to number in binary file *pat.out*. e.g. if the number read from file is 3 then pattern will be-



Attempt any two parts of the following: **(2× 5 = 10)**

(a) What is template in C++? Design a class template in C++ to create any type of array and find out first two minimum and maximum elements of array.

(b) Write the rules for calling function in case of overloaded function and template function. Write a function template in C++ to find number of unique elements in any type of array. e.g. if the array contains [1,2,1,3,4,2] then number of unique elements is 4.

(c) Write a program in C++ to read a file character by character, word by word and line by line. Also explain about functions used for manipulating file pointers.

Subject Code
BHM-01

Roll No 2021104094

M.C.A
Semester II Minor
Examination 2021-2022
Subject Name: Professional Communication

Time: 2 Hrs. Max Marks 30

Note: Answer all questions:

1. **Attempt any three parts of the following. [Q.1(a) is compulsory]**
   a. What do you mean by Communication? What is coding and decoding in Communication. (4)
   b. Discuss the barriers of communication. (3)
   c. What is verbal and non-verbal communication? What are their different uses? (3)
   d. Describe LSRW. What we learn from LSRW in our life. (3)

2. **Attempt any three parts of the following. Q.2(a) is compulsory.**
   a. What are the different types of parts of the speech? Discuss its various types. (4)
   b. What is the advantages verbal communication? (3)
   c. What is paragraph writing. Discuss any one of its types. (3)
   d. How will you improve your vocabulary? Discuss in detail. (3)

3. **Attempt any three parts of the following. Q.3(a) is compulsory**
   a. What is topic sentence? How will you decide any topic sentence? (4)
   b. Discuss the followings: (3)
      i-Proofreading
      ii- Technical communication
      iii- Speech vs enunciation
   c. What is the inductive and deductive method of paragraph writing? (3)
   d. What is phrase? How it differs from clause. (3)

Subject Code: BAS-03 Roll No

B.Pharma

SEM I ODD SEMESTER

MINOR TEST II(EXAMINATION) 2021-2022

Subject Name: Professional Communication

Time: 1 Hr. Max. Marks: 20

Note- Answer All the Questions

Q1- Attempt any two parts of the following. Q.1(a) is compulsory.

a) What is report writing? What are the types of report writing? Explain. 6

b) What do you mean by letter writing? What is the difference between formal and informal letter writing? 4

c) What is thesis? Draw a front matter of a thesis. 4

Q2- Attempt any two parts of the following. Q.2(a) is compulsory.

a) What steps will you initiate to overcome your nervousness and shyness in speaking english? Discuss in detail. 6

b) What is group discussion? What preparation you will do to appear in presentation? 4

c) Why it necessary to maintain good body language? What is the difference between body language and gesture. 4

Subject Code: BAS-03

Roll No 2021091073

B.Pharma

SEM I ODD SEMESTER

MINOR TEST (EXAMINATION) 2021-2022

Subject Name: Professional Communication

Time: 2 Hr.

Max. Marks: 30

Note- Answer All the Questions

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

a) What is Communication? What is the process of Coding and decoding in communication? 4
b) What do you understand by verbal communication? How it is different from non-verbal communication. Give some examples. 3
c) What are the roles of LSRW in effective communication? Express your views. 3
d) What are the barriers in communication? What steps will you initiate to eliminate barriers in communication? 3

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

a) What is informal channels of communication? Briefly define grapevine chain of communication. 4
b) What is Vocabulary? How strong vocabulary helps us in effective communication? 3
c) What is phrase? How it is differ from clause? 3
d) Briefly discuss about parts of speech. 3

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

a) What is proofreading? Why it is important in writings? Discuss. 4
b) What do you understand by the sequence of tenses? Elaborate. 3
c) What are antonyms? Why it is important of having sound collection synonyms and antonyms in effective communication. 3
d) What are the common errors we do in our day to day life during the writing and speaking English? Discuss briefly. 3

MCA 113 Roll No.

MCA
ODD SEMESTER
Minor Examination 2021 – 2022
Computer Organization & Architecture

Time: 02 Hrs Max. Marks: 30

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

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

a. Design a BCD to decimal decoder using the unused combinations of the BCD code as don't care conditions. (4)

b. Find the value of x in the following: (3)

(i) $(74246.25)_8 = (x)_{10}$ (ii) $x = 10^{th}$ complement of $(978)_{11}$

(iii) $(345)_6 \times (523)_6 = (x)_6$ (iv) $x = (11010)_2 - (1101)_2$ subtract using 2's complement.

c. Simplify the following expressions to (I) sum-of-products and (II) products-or-sums: (3)

(i) $(A + C' + D')(A' + B' + D')(A' + B + D')(A' + B + C')$

(ii) Convert the expression Y= (A+B)(A+C)(B+C') into standard POS form.

d. What is a multiplexer? Implement the following function using 16:1 MUX, 8:1MUX and 4:1 MUX:

$F(A,B,C,D) = \sum(0,1,2,3,4,5,7,10,14,15)$ (3)

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

a. (i) Show the three different representations for a negative decimal number N = -25 in binary. (4)

(ii) Give the truth table, characteristics table, excitation table and characteristic equation of SR flip-flop.

b. (i) Obtain the two canonical forms of the Boolean function F(A,B,C)=A'B+BC'+BC+AB'C' (3)

(ii) Simplify the Boolean function F= AB'+AB+BC. Draw the circuit using basic gates. How many logic gates do you save by simplification?

c. Design a combinational circuit that converts a four-bit reflected code (gray code) number to a four bit binary number. Implement the circuit with exclusive-OR gates. (3)

d. Minimize the following Boolean function using K- map and implement the simplified function using NAND gates only.

$F(A,B.C.D) = \Sigma(3,5,6,7)+d(10,11,12,13,14,15)$ (3)

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

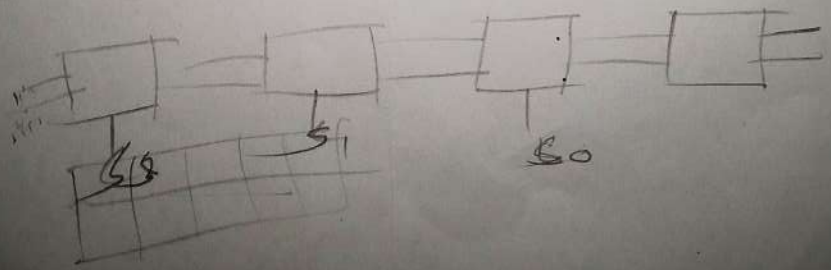
a. Design a synchronous counter which steers through the following states: S0-S6-S2-S7-S5-S3 using J-K Flip flop. (4)

b. Design a 4-line to 2-line priority encoder. Include an output E to indicate that at least one input is a 1. (3)

c. Explain race around condition in JK flip-flop. Explain how a master slave flip flop avoids race around condition. (3)

d. What is the disadvantage of binary parallel adder? Explain how a look ahead adder speeds up the addition process. Clearly show the derivations of equations. (3)

1010



MCA 103 Roll No.

MCA

ODD SEMESTER

Minor Test 2018 – 2019

Computer Organization & Architecture

Time: 02 Hrs Max. Marks: 30

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

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

a Find the value of x in the following: (4)

(i) $(746003)_8 = (x)_{10}$ (ii) x = 11^{th} complement of $(9779)_{12}$

(iii) $(3463)_7 X (6523)_7 = (x)_7$ (iv) $x= (11010)_2 - (1101)_2$ subtract using 2's complement.

b (i) Minimize the following Boolean function using K- map and implement the simplified function using NAND gates only. (3)

$F(A,B.C.D) = \sum m(0,1,2,3,7,8,10) + d(5,6,11,15)$.

(ii) Implement the Boolean function F = A'B'C + A'BC'+A'C' with NAND gate only.

d Simplify the following expressions to (I) sum-of-products and (II) products-or-sums: (3)

(i) (A + C' + D')(A ' + B' + D')(A ' + B + D')(A' + B + C')

(ii) C 'D + ABC' + ABD' + A'B 'D

e Given the Boolean expreesion F = x'y + xyz': (3)

(i) Derive an algebraic expression for the complement F'.

(ii) Show that F.F' = 0

(ii) Show that F+F' = 0

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

a Design a 4 bit carry look ahead generator with suitable diagram. (4)

b Design a BCD to decimal decoder using the unused combinations of the BCD code as don't care conditions. (3)

c Draw the logic diagram of a 2 to 4 line decoder with only NAND gates. Include an enable input. (3)

d (i) Implement the following four Boolean expressions with three half adders:

D = A'B' C+ A'B C' + AB'C'+ ABC (3)

E = A'BC + A B'C

F = AB C'+ (A'+ B')C

G = ABC

(ii) Construct a 32x1 multiplexer with only 2x1 multiplexers. Use block diagrams.

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

a Design a quad-to-binary priority encoder. Provide an output V to indicate that at least one of the inputs is 1. The input with the lowest subscript number has the highest priority. (4)

b Implement the following function using 16:1 MUX, 8:1MUX and 4:1 MUX.

$F(A,B,C,D) = \sum(2,4,5,7,10,15)$ (3)

c Draw the schematic diagram of J-K flip flop and describe it's working. Write down its truth table. (3)

d Design a 5-to-32-line decoder using a 3-to-8-line decoder, a 2-to-4-line decoder, and 32 2-input AND gates. (3)