Total No. of Questions : 10] [Total No. of Printed Pages : 3

Roll No. .....

MCA–103

M. C. A. (First Semester) EXAMINATION, June, 2008

PROGRAMMING AND PROBLEM SOLVING IN 'C'

(MCA – 103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Answer all questions. There is internal choice within each question. All questions carry equal marks.

Unit – I

1. (a) Explain the various stages of software development life cycle. 10

   (b) Point down the differences between an algorithm and a flowchart. 5

   (c) What do you understand by robustness of a program ? 5

Or

2. (a) What do you understand by structured programming ? Discuss the advantages of structured programming. 10

   (b) Write an algorithm to find out whether a given number is prime number and also draw the flowchart. 10

Unit – II

3. (a) What are the various data types in 'C' ? Explain mixed mode operation and automatic type conversion. 10

P. T. O.

(b) Write a program to convert binary number to a decimal number. 10

Or

4. (a) Write a short note on control structures in 'C'. 10

(b) Explain the following : 5 each

(i) Storage classes

(ii) Priority and associativity of operators

Unit – III

5. (a) Write short notes on the following : 3 each

(i) Function prototype

(ii) Call by reference

(iii) Formal and actual parameter

(iv) Local and global variables

(b) Write a function to obtain greatest common divisor of two integers m and n. 8

Or

6. (a) What is Recursion ? Explain its advantages and disadvantages. Write a recursive function to evaluate the factorial of a number n. 10

(b) Write a function which receives n numbers as an argument and returns the biggest of a given list of n values. 10

Unit – IV

7. (a) Distinguish between the following : 3 each

(i) malloc ( ) and calloc ( )

(ii) break and exit ( )

(iii) $*a$ and $**a$

(iv) pointer and array

(b) What is a pointer ? Discuss the advantages of pointers. 8

Or

8. (a) Differentiate between a structure and a union with the help of suitable example. 10

   (b) Write a program using pointers to sort the given list of numbers in ascending order. 10

Unit – V

9. (a) Write a program to create a data file with two data fields roll no. and marks. Also write a routine to update the marks by a new marks. 12

   (b) Differentiate between the following : 4 each

   (i) Function and preprocessor macro

   (ii) Sequential access and random access files

Or

10. (a) Explain various file handling functions in 'C'. Write syntax and examples of each. 10

    (b) What are command line arguments ? Write a program to read a text file and display its contents. Use command line argument to specify the file name. 10

Total No. of Questions : 5] [Total No. of Printed Pages : 4

MCA–103(N)

M. C. A. (First Semester) EXAMINATION, Jan./Feb., 2007

(New Course)

PROGRAMMING AND PROBLEM SOLVING IN C

[MCA – 103 (N)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : (i) Answer all questions.

(ii) There is internal choice within each question.

(iii) All questions carry equal marks.

1. (a) Define algorithm and write characteristics of a good program. How a program can be made robust ? What do you understand by structured programming ? 10

(b) Draw a flowchart to find prime numbers between 100 and 1000. 10

Or

(a) Differentiate between top down and bottom up design. What are the advantages of keeping programs simple ? Differentiate between analysis and design. 10

(b) Draw a flowchart to find top three numbers out of a given set of 100 numbers. 10

P. T. O.

2. (a) What is meant by hierarchy and associativity of operators ? Explain through suitable examples.

What are escape sequence characters ? Enumerate them. 10

(b) Write a program that prints the sum of digits of a number, the number is entered through keyboard. 10

Or

(a) (i) What will be output of the following code (*a*, *b*, *c* are integer variables) ? 5

```
a = 1;
b = 1;
c = + + a;
c = b + +;
printf ("a = %d, b = %d, c = %d", a, b, c);
```

(ii) What will be output of the following code, explain your answer (assume *a* and *b* are integer variables) ? 5

```
a = 15;
b = 15/2;
a = 1/2 * (a + b)
printf ("a = %d, b = %d", a, b);
```

(b) (i) Compare the use of switch statement with the use of nested if-else statement. 5

(ii) Write a program to print the following pattern using while loop : 5

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

3. (a) What do you understand by scope, life time and visibility of the variables ?

What are the advantages of modular programming ? 10

(b) Write a program to obtain the sum of the first ten terms of the following series using recursion : 10

$$x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \ldots\ldots$$

Or

(a) State several advantages to the use of functions.

What are formal and actual arguments ? Explain with suitable example call by reference parameter passing technique. 10

(b) Write a function for matrix multiplication. 10

4. (a) (i) Suppose an integer quantity is added to or subtracted from a pointer variable. How will the sum or difference be interpreted ? Explain your argument with suitable examples. 5

(ii) How is a multidimensional array defined in terms of an array of pointers ? Explain through suitable examples. 5

(b) Write a program in C that reads 10 records of student records. A student record consists of roll number, name and marks. Your program should print the records of students sorted in the descending order of their marks. 10

Or

(a) Discuss the following in brief : 10

(i) malloc function

P. T. O.

(ii) self referential structures

(iii) string

(iv) command line arguments

(b) Write a program to arrange the numbers stored in a one-dimensional array in ascending order. Make use of pointers wherever possible. 10

5. (a) Given a text file, create another text file deleting the words 'a', 'an', 'the' and replacing each one of them by a blank space. 10

(b) Differentiate between a function and preprocessor macro. Explain conditional compilation. Your explanation should be backed with suitable examples. 10

Or

(a) (i) Explain # indef and # pragma directives. 5

(ii) Write a brief note on Disk I/O functions. 5

(b) Write a program to count characters, spaces and new lines in a file. The name of the file should be entered through command line. 10

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–103(N)

M. C. A. (First Semester) EXAMINATION, May/June, 2006

(New Scheme)

PROGRAMMING AND PROBLEM SOLVING IN 'C'

[MCA–103 (N)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks. Short and to the point answer will fetch more marks.

1. (a) Explain the various phases of software development life cycle. 10

   (b) Draw a flowchart to print first fifty terms of Fibonacci series. 10

2. (a) What do you mean by scope and life of a variable ? Explain with example. 10

   (b) Write a program to calculate the telephone bill as per the following rules : 10

   First 200 calls are free

   Next 100 calls @ Rs. 1·80 per call

   And the next calls @ Rs. 2·30 per call

P. T. O.

Each time the program when run should first ask for the number of calls made and then print the amount payable.

3. (a) What is recursion ? Explain pros and cons of recursion. 6

(b) Write a program using a recursive function to reverse an integer number. 10

(c) Explain various distinct features of a C language. 4

4. (a) How can a list of strings be stored within a 2-D array ? How can the individual strings be processed ? What library functions are available to simplify string processing ? 10

(b) Write a program to sort a list of n numbers using bubble-sort. 10

5. (a) What is the difference between $++*p$ and $*p++$? Explain with an example code. 6

(b) What is an enumerated data type ? 4

(c) Explain pointers. What are the advantages and disadvantages of linked representation of data over sequential representation ? Write expression for the following : 10

(i) the address of var

(ii) the data type pointer-to-char

(iii) the variable var used as a reference argument

6. (a) What is the difference between opening a file in $w+$ mode and $a+$ mode ? 5

(b) Write a program that reads a text file and creates another file that is identical except that every blank space is replaced by a comma. 10

(c) What do you understand by associativity of operators ? Give suitable example also. 5

7. Write short notes on any *four* of the following : 20

(i) Pointer to function

(ii) Top-down design

(iii) Dynamic memory allocation

(iv) Bitwise operators

(v) Command line arguments

8. (a) Compare the use of the if-else statement with the use of ? : operator. In particular in what way can the ? : operator be used in place of an if-else statement ? 6

(b) Why is the use of the goto statement generally discouraged ? Under what conditions might the goto statement be helpful ? Discuss thoroughly. 6

(c) Correct errors (if any) in the following program and write down the output in each case : 8

```
main ( )
{
    int i = – 5, j = – 2;
    junk (i, & j);
    printf ("i = % d, j = %d", i, j);
}
junk (i, j)
int i, * j;
{
    i = i * i;
    * j = * j * * j;
}
```

Total No. of Questions : 8] [Total No. of Printed Pages : 4

MCA–103(O)

M. C. A. (First Semester) EXAMINATION, Dec., 2005

(Old Scheme)

PROGRAMMING AND PROBLEM SOLVING IN C

[MCA–103 (O)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) What are the important characteristics of a good computer program ? 6

   (b) Write an algorithm to arrange a given set of names in alphabetical order. 8

   (c) Compare topdown and bottom up approach of software design. 6

2. (a) What are data type qualifiers ? Discuss memory requirements for various type of qualified integer data types. 4

   (b) What do you mean by associativity of operators ? Discuss the associativity of different types of operators available in C. 6

P. T. O.

(c) Write a program in C to accept multiple lines of text as input and counts the number of lines, words and total number of characters in its input. 10

3. (a) Explain about the following : 8

(i) Scope of a variable

(ii) Formal and actual parameters

(iii) Parameter passing by reference

(iv) Local static variables

(b) What is recursion ? Compare it with iteration. 6

(c) Write a program in C using recursive function GCD() to calculate the greatest common divisor of two given numbers. 6

4. (a) What is dynamic memory allocation ? Give the syntax with examples and usage of the following functions : 8

(i) malloc( )

(ii) calloc( )

(iii) realloc( )

(iv) free( )

(b) Explain with examples the pointer concept in C. State the advantages and disadvantages of using pointers in C. 6

(c) How multiple values can be returned from a C function ? Write a program to pass an integer array and a scalar value to a function and to multiply all array elements by the scalar. 6

5. (a) Write a program in C using character pointers to perform the following. Write function for each one : 12

(i) Strcopy (copy one string to another)

(ii) Strlen (Length of the string)

(iii) Strcat (Concatenate two strings)

(iv) Strcmp (Compare two strings)

Give your own logic. Don't use in built functions.

(b) Explain the difference between the following : 8

(i) int *p (int a); and int (*p) (int a);

(ii) int *p [10]; and int (*p) [10];

(iii) int p (char (*a) [ ]); and int p (char *a[ ]);

(iv) int (*p) (char (*a)[ ]);
and int *(*p) (char (*a)[ ])

6. (a) Compare structures and union. Also give example and puspose of each. 4

(b) Write a program using structure to accept the current time in (Hr : min : sec), update it by one second, and to print it. 10

(c) Discuss about the following : 6

(i) Enumerated data type

(ii) Typedet

7. (a) What are command line arguments ? Give the type and purpose of each. Write a program in C to copy the contents of one file to another. Include the facility to run the program in command prompt by giving the name of existing file and the target file. 10

(b) Explain various file handling facilities provided in C language. Write syntax and examples of each. 10

P. T. O.

8. What are preprocessor directives ? Explain the purpose of the following by giving examples : 20

(i) # include

(ii) # define

(iii) # undef

(iv) # if, #elif, # endif

(v) # ifdef, #ifndef

3950

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–103

M. C. A. (First Semester) EXAMINATION, June, 2005

PROGRAMMING AND PROBLEM SOLVING IN 'C'

(MCA–103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) What are the different stages of software development ? Explain about each stage. 6

   (b) Draw a neat flowchart to find and print the sum of first N prime numbers. 8

   (c) Discuss about the following : 6

   (i) Rules of naming variables

   (ii) Conventions of coding

2. (a) What do you understand by type casting and type conversion ? Give examples. 4

   (b) Discuss about various types of storage class specifiers. Give proper examples of their usage. What restrictions are there on array and structure initialization ? 8

   (c) Write a program in C to convert a positive integer to another base. 8

P. T. O.

3. (a) What is operator precedence ? Give prioritywise hierarchy of operators available in C. 6

(b) Write a program in C to read an integer array and print the maximum value. Also print the numbers of occurrence of that value. 8

(c) Discuss how multiple values can be returned through a function ? 6

4. (a) Explain about various parameter passing techniques in C. Also give example of each. 6

(b) Write a program in C to read two arrays, add them and to print the resultant array. Use read_mat ( ), add_mat ( ) and print_mat ( ) functions. Arrays should not be declared as global variables. 10

(c) Write about different types of recursions you know. When recursion should be avoided ? 4

5. (a) Describe any *two* methods to access an array element. 2

(b) What are the operations that can be performed on pointers ? Explain by giving examples. 6

(c) Write a program using dynamically allocated arrays to read N names and to arrange them in alphabetical order. 12

6. (a) Explain the use of the following : 8

(i) break

(ii) continue

(iii) exit ( )

(iv) goto ( )

(b) Discuss about the following by giving examples : 12

(i) pointer to pointer

(ii) pointer to function

(iii) function returning pointers

(iv) function as parameter

7. (a) How does the C preprocessor work ? Can multiple directives occur on the same line ? Explain about any *four* preprocessor directives. 4

(b) Discuss about the commonly used conversion characters and flags for data output in C. Also explain about various output formatting techniques with examples. 6

(c) What are self referential structures ? Write a program in C to display the use of self referential structures. 10

8. An Employee file contains information such as employee number, name, date of birth, salary etc. 20

Write a program in C to :

(i) create such a file

(ii) to store details of n employees

(iii) to read the file

(iv to display its information in descending order of salary

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–103

M. C. A. (First Semester) EXAMINATION, Dec., 2004

PROGRAMMING AND PROBLEM SOLVING IN C

(MCA – 103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Differentiate between top down and bottom up design. 5

   (b) What do you understand by robustness of a program ? How it can be made robust ? 5

   (c) Describe the characteristics and purpose of escape sequence characters. 10

2. (a) What is the difference between character I/O and string I/O ? 5

   (b) Differentiate between the following : 5

   (i) puts ( ) and putch ( )

   (ii) getch ( ) and getche ( )

   (c) Draw a flowchart for summing the following series : 10

$$s = x - x^3 + x^5 - x^7 \ldots\ldots x^n$$

P. T. O.

3. (a) Write a program to read a positive number 'n' and perform the squares of the individual digits. For example if $n = 1205$ then output will be 1 4 0 25. 10

   (b) Can we change base address of array ? Explain multidimensional array. 5

   (c) Differentiate between structure and union taking suitable example. 5

4. (a) Write a program that reads a square matrix A and prints the product of A and A' where A' is transpose of matrix A. For this program write a function to transpose the matrix. 12

   (b) Write a program that can read given 'n' number of words and then words with their word length are printed. 8

   example input : "age", "wage", "help"

   output : age : 3, wage : 4, help : 4

5. (a) Write a recursive function to calculate Σn.

   $(\Sigma n = 1 + 2 + 3 + ... + n)$ 7

   (b) What is a global pointer ? 5

   (c) Explain the function with suitable examples : 8

   (i) malloc

   (ii) calloc

   (iii) free

6. (a) Elaborate conditional compilation. 5

   (b) What are self referential structures and what is their use ? 5

   (c) Write a program to write contents of one file in reverse into another file. 10

7. (a) Write a program using pointers to read in an array of integers and print its elements in reverse order of index. 8

   (b) Distinguish between the following : 12

   (i) $(*m)[5]$ and $*m[5]$

   (ii) $*a$ and $**a$

   (iii) call by reference and call by value

8. Write short notes on any *four* of the following : 20

   (a) Tail recursion

   (b) Loop control statements in C

   (c) Advantages of modular program design

   (d) Type conversion

   (e) Goto statement

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–103

M. C. A. (First Semester) EXAMINATION, June, 2004

PROGRAMMING AND PROBLEM SOLVING IN C

(MCA – 103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Solve any *five* questions. All questions carry equal marks.

1. (a) In which order compiler, preprocessor and assembler are used to generate executable code from a C program ? Briefly state the function of each of them. 8

   (b) What do you understand by structured programming ? State the advantages of modularization. 8

   (c) What do you understand by associativity of operators ? Explain through suitable examples. 4

2. (a) Draw a flowchart for searching the largest and second largest number from given set of numbers. 10

   (b) Discuss characteristics of algorithm. 5

   (c) Explain the ternary operator of C with suitable example. 5

3. (a) A finance company offers three investment schemes; simple interest of 20%, compound interest of 18%

P. T. O.

compounded annually and compound interest of 15% compounded every six months. Write a program that reads the amount and the time for which the money is invested and advice the best choice of scheme. 10

(b) What is a header file ? What are the advantages of using header files ? In C, how header files are created and used ? 10

4. (a) Write your own function in C which will compare two strings and report whether they are lexically equal or not, without using any library function. 10

(b) Explain the effect of '+ +' operator with pointer of all data types. What arithmetic can be performed with pointers ? What is the base address ? How is it accessed differently for one-dimensional and two dimensional arrays ? 10

5. (a) What is recursion ? Explain its advantages and drawbacks ? What is tail recursion ? 10

(b) What are command line arguments ? Write a program using command line arguments to read any text file from command prompt and display its contents. 10

6. (a) Write a function for matrix multiplication, using this function complete the program to demonstrate whether given matrices A and B are commutative or not. Matrices A and B are commutative if : 12

$$A \times B = B \times A.$$

(b) Explain enumerated data types with suitable example. 8

7. (a) Elaborate upon conditional computation. 5

(b) Differentiate between a preprocessor macro and a function. 5

(c) Explain use of the following functions : 10

(i) malloc ( )

(ii) calloc ( )

(iii) free ( )

8. Write short notes on any *four* of the following : 20

(a) Formatted I/O

(b) Type casting

(c) Use of 'Union' data structure

(d) Pointer to function

(e) Control statements in C

Total No. of Questions : 8] [Total No. of Printed Pages : 2

MCA – 103

M. C. A. (First Semester) EXAMINATION, June, 2003

PROGRAMMING AND PROBLEM SOLVING IN C

(MCA – 103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Write an algorithm to calculate the factorial of a given number and also draw the flow chart.
   (b) Differentiate between top-down and bottom up design.
   (c) Explain characteristics of a good program.

2. (a) What are theory operations ? Explain with example.
   (b) Write a program that examines all the numbers from 1 to 999 displaying all those for which the sum of cubes of digits equal to the number itself.
   Equation $563 = 5^3 + 6^3 + 3^3$.
   (c) Explain what do you mean by operation precedence.

3. (a) Write a program to sort the array of strings. 15
   (b) Differentiate between break and continue statement.

4. (a) Explain various preprocessor directives with examples. 10

P. T. O.

(b) Differentiate between macro and function. Also explain nested macros with example. 10

5. Write a program that concatenates two files, that is, append the contents of one file to the end of another and write the resulting third file.

6. Explain the use of the following with example :
   (i) Malloc ( )
   (ii) Calloc ( )
   (iii) Size of operator
   (iv) free ( )
   (v) sscan f ( )
   (vi) sprint f ( )
   (vii) strlen ( )
   (viii) static variable
   (ix) auto variable
   (x) stremp ( )

7. (a) Write a program that replaces two or more consecutive blanks is a string by a single blank.
   (b) Explain call by value and call by reference.

8. Write short notes on any *four* of the following :
   (a) Structures
   (b) Enumerated data type
   (c) Storage classes
   (d) History of C
   (e) Control structures

Total No. of Questions : 8] [Total No. of Printed Pages : 2

MCA–103

M. C. A. (First Semester) EXAMINATION, Dec., 2003

PROGRAMMING AND PROBLEM SOLVING IN C

(MCA – 103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Explain the various phases of system development life cycle. 10

   (b) Explain modularization. Also explain the characteristics of good program. 10

2. (a) Explain the storage classes in C. 10

   (b) Write a program to print the prime numbers from 1 to 300. 10

3. (a) Write a program to print the following output : 10

A B C D E

A B C D

A B C

A

   (b) Draw the flowchart for sorting the array of numbers. 10

P. T. O.

4. Write a program to the calender of the given month and year. Given that the 01/01/1900 is Monday. 20

5. Differentiate between the following : 20
   (i) Pointer and array
   (ii) Structure and Union
   (iii) Local and global variable
   (iv) do-while and while-do statement
   (v) Flowchart and procedure

6. (a) Write a program to remove all the remarks from a C program. 10
   (b) Explain the two ways of declaring a structure. 5
   (c) Can a structure be recursive ? Explain. 5

7. (a) Explain the purpose of free function. 5
   (b) Explain size of operation. 5
   (c) What is the advantage of representing an array of strings by an array of pointers to strings ? 5
   (d) What is indirection operator ? 5

8. Write short notes on any *three* of the following : 20
   (a) C preprocessor
   (b) User defined function
   (c) Structured programming
   (d) Characteristics of a good program

Total No. of Questions : 8] [Total No. of Printed Pages : 4

MCA – 103

M. C. A. (First Semester) EXAMINATION, Dec., 2002

PROGRAMMING AND PROBLEM SOLVING IN C

(MCA – 103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Define and discuss the concept of structure, modularity and functionality in the context of programming languages. 5

   (b) Distinguish between procedural and object oriented programming paradigm. 5

   (c) Distinguish between top-down and bottom-up design strategies. 5

   (d) Discuss some of the conventions/rules for naming the variables, functions and constants in C language. 5

2. (a) Write a program to display the amount of storage allocated by the compiler to the following data types : char, int, short int, long int, float, double and long double. 5

   (b) How is the following statement interpreted ?

   EXP1 ? EXP2 : EXP 3;

   Explain with an example. 5

P. T. O.

(c) Write a program to find out the side of a square whose area is the same as the area of a circle of given radius Define RADIUS and PI as symbolic constants. Area of a circle is $2 * PI * r^2$, then the side of square will be sq-root (area of circle). 5

(d) Write a program to input a string of at most 80 characters from a single line and output the same. 5

3. (a) Write a program to count the number of digits, white spaces and other characters in the input from standard input. Take the following characters as white spaces : ' ', '\t', '\f', '\b', '\v'. Use "switch" statement in your program.

Modify the program to make use of 'if else' statement. 10

(b) Write a program to print the frequency of alphabets, digits, white spaces and other characters in the input. Modify this program to show these frequencies as a histogram. Build your histogram by displaying a counted number of stars of each category. 10

4. (a) Write a program to read employee name, employee age and employee salary. Declare suitable record structure to hold the employee data and declare an array of such structure. Sort the input by the age and print the results. Assume there are n employees. 10

(b) Write a program using recursive function to output in reverse the sequence of characters input from the keyboard. The input is terminated by new line or end of file. Your output should be on a new line. Write an iterative solution for the same. 10

5. (a) Distinguish between the following : 10
   (i) Actual and formal arguments
   (ii) Global and local variables
   (iii) Automatic and static variables
   (iv) Global and extern variables

   (b) How does a structure differ from an array ? Explain the meaning and purpose of following : 10
   (i) Template
   (ii) Tag
   (iii) Sizeof
   (iv) Struct

6. (a) Write a program to read two arguments from the command line. Assume that the arguments are strings. Print the size of each string as well the string which is lexicographically smaller. 8

   (b) Write a program to compute the addition and multiplication of two 3×3 matrices. Use madd and mmul as two functions for this purpose. 8

   (c) Distinguish between nested structures and array of structures. 4

7. (a) Write a program that will generate a data file containing the list of customers and their corresponding telephone numbers. Use a structure variable to store the name and telephone of each customer. Create a data file using a sample list. 10

   (b) Write a program to read the customers file created in part (a). Sort the data in ascending order on the basis of telephone number and generate another data file having sorted information. 10

P. T. O.

8. (a) How does program design relate to program efficiency ? 5

(b) Readability is more important than efficiency. Comment. 5

(c) Distinguish between the following : 10

(i) Syntactic error and semantic error

(ii) Run-time error and logical error

(iii) Run-time error and latent error

(iv) Debugging and testing

(v) Compiler testing and run-time testing

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–103

M. C. A. (First Semester) EXAMINATION, June, 2002

PROGRAMMING AND PROBLEM SOLVING IN C

(MCA – 103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Solve any *five* questions.

1. (a) What do you understand by time and space complexity of algorithms ? What is the importance of documentation ? 10

   (b) Write an algorithm for finding the largest of a given set of numbers. 10

2. (a) Write the rules and naming convention for identifiers in C. 5

   (b) What are the header files and library files ? 5

   (c) Explain the atoi ( ) and itoa ( ) data conversion functions with suitable examples. 5

   (d) What do you understand by type casting ? Explain its need taking suitable example. 5

3. (a) Compare and contrast recursion and iteration and write a function power (a, b) to calculate a^b using recursion considering a and b as integer arguments. 10

P. T. O.

(b) Write a program in C that reads n numbers into a one-dimensional array and sort them in descending order. 10

4. (a) The equation $x^2 + y^2 = r^2$ represents a circle with centre at origin and radius r. Write a program that reads r from the keyboard and print the number of points with integer co-ordinates that lie within the circle. 10

(b) Discuss the syntax and use of break and continue statement in C with suitable example. 5

(c) Why use of go to statement is avoided ? Comment. 5

5. (a) Discuss the associativity of operators. Also write the hierarchy of operators in C. 5

(b) Briefly discuss get char ( ), puts ( ) and flush ( ) functions. 5

(c) How two-dimensional arrays can be initialized ? Explain through suitable example. 5

(d) What will be the output of following program : 5

```
main ( )
{
  static char a [ ] = "DELHI";
    Char *b = "DELHI"
      printf ("\n %d %d" size of (a), size of (b));
```

6. (a) Discuss enumerated data types and typedef. 8

(b) Use structure to store data about 10 books. In your program data about book entails book title, price and number of copies of the book. After reading the data about books your program should display the data of all the books which cost more than Rs. 200. 12

7. (a) Compare and contrast the following : 8
   (i) Union and struct
   (ii) malloc (C) and calloc (C)

   (b) Write a program in C that will read a file having text and prints the following information about the file that it contains : 12
   (i) how many characters
   (ii) how many words
   (iii) how many lines

8. Write short notes on any *four* of the following : 20
   (a) command line arguments
   (b) pointer to functions
   (c) pointer arithmetic
   (d) tail recursion
   (e) conditional compilation

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–103

M. C. A. (First Semester) EXAMINATION, Dec., 2001

PROGRAMMING AND PROBLEM SOLVING IN C

(MCA—103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Compare and contrast top down and bottom up approach. 5

   (b) Discuss the advantages of modularization. 5

   (c) Draw a flowchart for finding out whether the given number is a prime number. 10

2. (a) What do you understand by structured programming ? What are the advantages of structural programming ? 8

   (b) What is the use of storage classes static and register ? 4

   (c) Write C language equivalent of the following : 8

   (i) $4x^4 + 3x^3 + 2x^2 + x + 1$

   (ii) $\frac{a\, e^{-kt}}{b - c}$

   (iii) $\frac{\log_{10} x + \log_e y}{|x - y|}$

   (iv) m^n

P. T. O.

3. (a) Consider the function :

```
int doit (int n)
  {  if (n > 1)
          return (1 + doit (n/2));
     else
          return 0
  }
```

What will be the value of K in the statement K = doit (16). 5

(b) Discuss the parameter passing techniques pass by value and pass by reference with suitable example. 5

(c) Write a program in C that reads in a square matrix and to print whether this matrix is symmetric or it is not. 10

4. (a) Write a program to find the sum of the series :

$$S = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots\ldots \infty$$

upto the desired accuracy entered to the program as input and value of x will also be entered as input. 10

(b) Explain with examples following functionalities provided by C preprocessor : 10

(i) file inclusion

(ii) macro substitution

(iii) conditional inclusion

5. (a) What are self-referential structures ? Where are they frequently required ? 5

(b) How can a one-dimensional array of pointers be used to represent collection of strings ? 5

(c) Instead of declaring x as one -dimensional array of integer elements define x as a pointer variable equivalently. What is the difference between these two approaches ? 10 5

(d) What arithmetic can be performed with pointer variables and what does it mean, discuss ? 5

6. (a) Write a program in C that will append the contents of second file at the end of first file and write the result into third file. You must be able to execute the command at DOS prompt in a similar syntax mentioned below : 12

>append file 1.txt file 2.txt file 3.txt

(b) Describe two different approaches of updating a data file. Which approach is better and why ? 8

7. (a) Define a union type ans that contains 4 data members. These four data members are of the type int, long, float, and double precision. How many bytes a variable of this union type will require ? 6

(b) Write a C program that reads several different records. Each record is a collection of roll number and marks. Your program should rearrange the records in the descending order of marks and hence show the merit list. 14

8. Write short notes on any *four* of the following : 20

(a) History of development of C

(b) Bitwise operators

(c) Enumerated data types

(d) Escape sequence characters

(e) Formated input and output