PROGRAMMING FOR PROBLEM SOLVING
(CSE 1001)

Time Allotted : 2½ hrs **Full Marks : 60**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve: **12 × 1 = 12**

Choose the correct alternative for the following

(i) What is the output of the following program ?

```
void main( )
{
        int x=40;y=40;z=80;
        if(x!=y && y<z)
                printf("\n Hello world");
        else
                printf("\nWelcome");
}
```

(a) Hello world (b) Good by
(c) Compile time error (d) None of these

(ii) How many byte/s does "char" data type occupies in memory?
(a) 1 (b)8 (c)10 (d) 4.

(iii) In which part of the program compilation process macros are dealt with?
(a) Assembly (b) Pre-processing
(c) Linking (d) None of these.

(iv) What would be the output of the following code snippet?

```
for (i=1; i<=5; i++)
{
        if (i%2!=0)
                continue;
        printf("%d ",i);
}
```

(a) 2 4 (b) 1 3 5 (c) 1 2 3 4 5 (d) No output.

(v) Which of the following is used as a string termination character?
(a) \n (b) \0 (c) /0 (d) \t.

(vi) Given the following declarations and an assignment statement, which one is the equivalent expression for str[4]?

```
char str[10], *p;
p=str;
```

(a) p + 4 (b) *p + 4 (c) *(p + 4) (d) p[3]+1.

(vii) Which escape character can be used to begin a new line in C?

(a) \a (b) \b (c) \t (d) \n.

(viii) What will be the output of the following C code?

```
#define SQUARE(X) X * X
int main ( )
{
        printf (“%d” , SQUARE(3+2) );
        return 0;
}
```

(a) 25 (b) 11 (c) 22 (d) Compilation error

(ix) In C language, FILE is of which data type?

(a) int (b) char * (c) struct (d) unsigned long int

(x) The operator && is an example for ___ operator.

(a) Assignment (b) Increment (c) Logical (d) Rational

Fill in the blanks with the correct word

(xi) The expression 7 + 10 % 6 / 2 evaluates to _____.

(xii) The full form of RAM is _____.

(xiii) An Ampersand when used before the name of a variable in a c program, then it denotes _____ of the variable

(xiv) The output of the following program will be _____.

```
void main()
{
char *p=”Hello world”;
char *q;
p++;
q = p;
q++;
printf(“\n %s, %s",p,q);
}
```

(xv) The memory size of a double precision floating point number is _____ bytes.

Group - B

2. (a) Discuss about the differences between following topics:
(i) Primary Memory and Secondary Memory of computer
(ii) Compiler and interpreter. *[(CO1,CO2)(Understand/LOCQ)]*

(b) Draw a flowchart to find the sum of all even numbers within the range of 100 to 500, including both endpoints. *[(CO3)(Understand/LOCQ)]*

(c) Find the binary and hexadecimal equivalent of a decimal number $(7886)_{10}$. *[(CO1,CO2,CO3)(Apply/IOCQ)]*

5 + 4 + 3 = 12

3. (a) Convert the following numbers from one number system to the specified one:
(i) $(31.125)_{10}=(?)_2$
(ii) $(34465361)_8=(?)_{16}$
(iii) $(1111.11)_2=(?)_{10}$ *[(CO2)(Understand/LOCQ)]*

(b) Find the IEEE 754 single precision floating point representation of the decimal number -12.65. *[(CO1,CO2)(Apply/LOCQ)]*

(c) Why do we prefer 2's complement over 1's complement? *[(CO2)(Understand/LOCQ)]*

(2 + 2 + 2) + 4 + 2 = 12

Group - C

4. (a) Write a C program to check whether a number taken as input is a palindrome number or not? A palindrome number is a number (such as 121) that remains the same when its digits are reversed. *[(CO4,CO5)(Understand/LOCQ)]*

(b) Differentiate between "break" and "continue" statements with examples. How is break statement different from exit () statement? *[(CO4,CO5)(Remember/LOCQ)]*

(c) Write a complete C program to find the sum of first n terms of the following series where the value of n is a user input.
S= 1 - 1/3 + 1/9 - 1/27 + 1/81 - 1/243 + …. *[(CO4,CO5)(Apply/LOCQ)]*

4 + (2 + 2) + 4 = 12

5. (a) What is type conversion in C language? Explain it with a suitable example. *[(CO2,CO4)(Apply/IOCQ)]*

(b) Write a C program to find the sum of all digits of an integer number. *[(CO3,CO4,CO5)(Apply/IOCQ)]*

(c) Write a C program to find the sum of the following series (**without using pow library function**), where x and n will be given as input :
Sum= $x+x^2+x^4+x^8+x^{16}$ ..... up to **n^{th} term** *[(CO3,CO4,CO5)(Apply/HOCQ)]*

2 + 4 + 6 = 12

Group - D

6. (a) Write a C program that reads a line of text containing both uppercase and lowercase letters, stores it in a suitable array, and then outputs it in all uppercase letters. *[(CO4,CO5)(Apply/IOCQ)]*

(b) What are function prototypes? Where and why are the prototypes normally used? *[(CO4)(Remember/LOCQ)]*

(c) How is an array name interpreted when it appears as an argument to a function? Explain with a suitable example. *[(CO5,CO6)(Analyze/HOCQ)]*

4 + (2 + 2) + 4 = 12

7. (a) Do you think that any array of character is a string? Give reason to support your answer. *[(CO2,CO4,CO6)(Understand/IOCQ)]*

(b) Write a program to concatenate (or merge) two strings into a single string *[(CO3,CO4,CO6)(Apply/IOCQ)]*

(c) Explain how a pointer can be used to allocate and access a 1D array of integer, with an appropriate example. *[(CO2,CO3,CO4,CO6)(Apply/IOCQ)]*

(d) Write a C program to implement a function to swap two integer variables, using call by address function calling method. *[(CO4,CO6)(Apply/HOCQ)]*

2 + 4 + 3 + 3 = 12

Group - E

8. (a) Define a structure for a 2 dimensional geometric point having x and y coordinate. Write a C program using the above defined structure to find the distance between any two geometric points (x_1, y_1) and (x_2, y_2) where the distance formula -

$$\mathbf{Distance} = (\mathbf{x_1} - \mathbf{x_2})^2 + (\mathbf{y_1} - \mathbf{y_2})^2$$

[(CO2,CO3,CO4,CO6)(Apply/HOCQ)]

(b) Various modes of creating, appending and accusing files in C along with a suitable C program as example. *[(CO2,CO4,CO6)(Understand/IOCQ)]*

6 + 6 = 12

9. (a) Write a C program to copy the contents of a text file to another text file where the source and destination file names will be entered by the user. *[(CO4,CO6)(Apply/HOCQ)]*

(b) Define a structure called '*Distance*' comprising of two integer attributes: '*feet*' and '*inches*'. Write a program that takes input for two distances in feet and inches, calculates their sum, and displays the result in feet and inches. *[(CO4,CO6)(Apply/IOCQ)]*

6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	38.54	35.42	26.04

Course Outcome (CO):

After the completion of the course students will be able to

CSE1001.1: Remember and understand the functionalities of the different hardware and software components present in a computer system, the standard representations of various types of data in a computer system.

CSE1001.2: Illustrate how a computer system with one way of representation can be converted to one another equivalent representation.

CSE1001.3: Construct flow charts for any arithmetic or logical problems in hand.

CSE1001.4: Remember and understand the C programming development environment, writing, compiling, debugging, linking and executing a C program using that development environment, basic syntax and semantics of C programming language and interpret the outcome of any given C program.

CSE1001.5: Use loop constructs, conditional branching, iteration, recursion to solve simple engineering problems.

CSE1001.6: Apply pointers, arrays, structures, files to formulate simple engineering problems.

**LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.*