B1.3-R3: PROGRAMMING AND PROBLEM SOLVING THROUGH 'C' LANGUAGE

NOTE:

1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.

2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.

3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

TOTAL TIME: 3 HOURS **TOTAL MARKS: 100**

(PART ONE – 40; PART TWO – 60)

PART ONE
(Answer all the questions)

1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1 x 10)

1.1 Given the following code fragment:

```
void main(void)
{
      char x = '\0';
      char n = 'N';
      printf("%u" "%s\n", &n, &n);
}
```

What will be the result of execution?

A) ddddd N (where d represents any digit)
B) 78 N
C) 78 garbage
D) compilation error

1.2 Given the following code fragment:

```
int main(void)
{
      int raw[20], i, sum=0;
      int *p = raw;
      for (i=0; i < 20; i++)
            *(p+i) = I;
      for(i=0; i < 20; I += sizeof(int))
            sum += *(p+i)
      printf("sum = %d\n", sum);
      return();
}
```

What will be the result of execution?

A) sum = 10
B) sum = 40
C) sum = 60
D) sum = 190

1.3 What is the missing statement in the following function which copies string x into string y

```
void strcpy( char *x, char *y)
{
        while (*y != '\0')
        ……..                    /* missing stament */
        *x = '\0';
}
```

A) x = y
B) *x++ = *y++
C) (*x)++ = (*y)++
D) none of the above

1.4 Consider the following program,

```
main( )
{
        int x = 49;
        for(;x;)
        x--;
        printf("%d\n", x);
}
```

the output of the program will be

A) 49
B) 0
C) -49
D) none of the above

1.5 # define dp(e) printf(#e " = %d\n",e)

```
main( )
   {
        int x =3, y = 2;
        dp(x/y)
   }
```

What will be the output of the program?

A) prints x/y = 1
B) prints #e = 1.5
C) prints #x/y = 1
D) none of the above

1.6 Assume that *i*, *j* and *k* are integer variables and their values are 8, 5 and 0 respectively. What will be the values of variables *i* and *k* after executing the following expressions?

k = (j > 5) ? (i < 5) ? i-j: j-i: k-j;
i -= (k) ? (i) ? (j): (i): (k);

A) -3 and 3
B) 3 and -5
C) 3 and -3
D) -5 and 3

1.7 The && and | | operators

A) compare two numeric values
B) combine two numeric values
C) compare two boolean values
D) none of the above

1.8 An external variable is one

A) Which resides in the memory till the end of the program
B) Which is globally accessible by all functions
C) Which is declared outside the body of any function
D) All of the above

1.9 Find the error in the following program:

```
main( )
{
      int m;
      char g;
      switch(m)
      {
            case 5     : grade="P";break;
         case 2   : grade="Q";break;
         case 2   : grade="R";break;
         default  : grade="S";break;
     }
      }
```

A) No two labels may be identical
B) switch statement cannot have more than three labels
C) case label cannot be numbers
D) none of the above

1.10 Consider the following program:

```
main( )
{
      char *k="xyz;
      f(k);
      printf("%s\n",k);
}

f(char *k)
{     k = malloc(4);   strcpy(k, "pq");}
```

What will be the output?

A) pq
B) xyz
C) syntax error
D) none of the above

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the "tear-off" sheet attached to the question paper, following instructions therein. (1 x 10)

2.1 Arrays in 'C' language are always stored in column-major fashion.

2.2 for(;;) will give syntax error in 'C' language.

2.3 For command line arguments, argv is a pointer to an array of pointers.

2.4 A member of any structure is referred to in an expression by a construction of the form structure-name → member.

2.5 Bitwise fields can be of any type.

2.6 goto statement transfer the control from one function to another.

2.7 An array's name is a pointer constant.

2.8 C allows different variables to have the same name.

2.9 Variables defined in the same function always have the same scope.

2.10 Each symbol constant requires a separate # define directive to create it.

3. Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1 x 10)

X		Y	
3.1	Parameter passing scheme in 'C'	**A.**	Dangling pointer
3.2	Size of 'char' variable in byte/bytes	**B.**	Postfix expression
3.3	Heap	**C.**	Call by value
3.4	Double (*X)[10]	**D.**	2
3.5	0x7FFF refers to a constant	**E.**	Garbage pointer
3.6	Implementation of library function	**F.**	Expression
3.7	Pointer with address of a free variable	**G.**	Area for Dynamic memory allocation
3.8	Object	**H.**	1
3.9	Lvalue	**I.**	Storage
3.10	Function call	**J.**	Double x[10]
		K.	Octal
		L.	Header
		M.	Double x[ ] [10]
		N.	Hexadecimal
		O.	Library

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Enter your choice in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1 x 10)

	Equality		Inequality		Equal
	Different		Double		Single
	Fixed		Variable		fseek(fp, 0L, 0)
	fseek(fp, 0L, 1)		semicolon		prenthesis
	4 bytes		do…while		while…do
	|		||		t
	(*t)				

4.1 Operators &, ^, = = have _____ precedence.

4.2 The logical operator = = checks for _____ of two values.

4.3 A character constant is a sequence of one or more characters enclosed in _____ quotes.

4.4 printf( ) function uses _____ number of arguments.

4.5 rewind (fp) and _____ performs the same operation.

4.6 The contents of two pointers that point to adjacent variables of type float differ by _____.

4.7 A function name must be followed by _____.

4.8 _____ iterative statement will always be executed atleast once.

4.9 _____ is the bitwise inclusive or operator.

4.10 If "t" is a pointer to a structure then "t→" is the same as _____.

PART TWO

(Answer any **FOUR** questions)

5.

a) The sequence of Fibonacci numbers is defined as below:

f(i) = f(i-1) + f(i-2) with f(0) = 1 and f(1) = 1

Draw a flowchart and then develop a 'C' program to calculate and display Fibonacci numbers.

b) Write a 'C' program to calculate the frequencies of different alphabets, present in a given string. The string of alphabets is to be taken as input from the keyboard.

(7+8)

6.

a) Write a 'C' program to do the following:

i) Accept a sequence of integer numbers from the keyboard

ii) Sort the sequence in ascending order

iii) Output the position of each element of the input sequence in the sorted array.

b) Develop a flowchart and then develop 'C' program to find the union of two set of characters, taken as input from the keyboard.

(8+7)

7.

a) Write a 'C' program to accept any 3 digit integer number from the keyboard and display the word equivalent representation of the given number.

b) Write a 'C' program to accept a date in the format DD/MM/YYYY and add an integer to get the resultant date.

(9+6)

8. Define a suitable data structure to store the information like student name, roll number, enrolment centre and marks of five different subjects. Write a 'C' function to insert sufficient data in your data structure and function to print the name of the student and the total obtained marks who have secured highest total marks for each and every enrolment centre

(15)

9.

a) Define a self referential structure to represent a set of integer numbers in linked list form.

b) Write a 'C' function to split the list in several sub-lists depending on the number of digits representing the integers i.e. single digit integers will form a list, double digit numbers will form another list and so on.

(3+12)