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. In a for loop with a multi statement loop body, semicolons should appear following:
A) the for statement itself
B) the crossing brace in the multiple statement loop body
C) each statement within the loop body and the test expression
D) each statement within the loop only

1.2. When we execute **X++;** the value of the expression **X++** :
A) is equal to the original value of X
B) is one more than the original value of X
C) is X times more than the original value of X
D) none of the above

1.3. An Array's name is a:
A) Pointer constant
B) Pointer variable
C) Variable name
D) None of the above

1.4. What is printed?

```
for ( i=1; i<=5;)
      i++;
      printf("%d",i)
```

A) 23456
B) 12345
C) 123456
D) error

1.5. What will assign in **s**, when we use the following pair of statements in c-program:

```
char *s;
s = "my car color is : white";
```

A) first character of the string constant
B) complete string
C) address of the string storage
D) is a logical error

1.6. C uses pointers explicitly with:
A) Arrays
B) Structures
C) Functions
D) All of the above

1.7. The values of the following storage classes are initialized by the compiler
A) auto and extern
B) register and static
C) static and extern
D) auto and register

1.8. Consider the following declarations.

```
union id {
      char color;
      int size;
        }
struct {
      char country;
      int date;
      union id i;
      } flag;
```

To assign a color to a flag, the correct statement would be
A) flag.color = 'W';
B) flag.i.color = 'W';
C) flag.color = 'White';
D) flag.i.color = 'White';

1.9. Which of the following is true for the switch statement:

```
switch(var)
{
};
```

A) Can be used when only one variable is tested
B) The variable must be an integral type
C) Each possible value of the variable can control a single branch
D) All of the above

1.10. Enumeration is:
A) A list of strings
B) A set of numbers
C) A set of legal values possible
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 An ampersand (&) is required before each variable name in printf.

2.2 It is an error to place the pound(#) sign of a preprocessor control line in any column except column 1.

2.3 The goto statement is a branching statement in 'C' programming.

2.4 An expression with the star operator, such as *ptr, cannot occur on the left-hand side of an assignment statement.

2.5 An array's name by itself cannot occur as the left-hand side of an assignment statement.

2.6 Function calls cannot be nested.

2.7 Each function must have at least one return statement.

2.8 A linked list is a data structure, which is created by dynamic allocation of memory.

2.9 The declaration **void function-name()** indicates that function-name returns nothing to the calling program.

2.10 Member variables of two different structures may have the same name.

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	a[i] can be written as	**A.**	Unending loop if no break statement inside the body
3.2	calloc( )	**B.**	p is a pointer to a function that returns integer
3.3	union	**C.**	allocate and clear memory
3.4	for(;;)	**D.**	*(a + i)
3.5	register variable	**E.**	allocates memory but does not clear memory
3.6	int(*p)[10]	**F.**	is a memory location that is used by several different variables, which may be of different type.
3.7	int(*p)(void*,void*)	**G.**	directives
3.8	do-while loop	**H.**	Increase in speed of execution
3.9	#include, #define	**I.**	p is pointer to an array of integers
3.10	typedef	**J.**	p is function that returns pointer to integer
		K.	This guarantees that the loop is executed at least once before continuing
		L.	preprocessor
		M.	can be used to create variables of new types

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)

A.	array	**B.**	string	**C.**	typedef
D.	Cast	**E.**	structure	**F.**	EOF
G.	void	**H.**	C functions	**I.**	gets
J.	C preprocessor	**K.**	getstr	**L.**	DEFINE
M.	&	**N.**	char	**O.**	malloc

4.1 The _____ operator is used to convert one data type to another.

4.2 If the pointer variable ptr holds the address of a char, the data type of *ptr will be _____.

4.3 **File** is defined with a(n) _____ statement.

4.4 Functions of type _____ do not return a value to the calling segment.

4.5 A(n) _____ is a collection of variables under a single name.

4.6 _____ reads a whole line of input into a string until a new line or EOF is encountered.

4.7 Expressions can be made equivalent to a single identifier using the preprocessor _____ command.

4.8 The _____ is a program that is executed before the source code is compiled.

4.9 The _____ operator is unary operator to find the value of a variable.

4.10 Dynamic allocation of memory for structure can be done with the help of the _____ function.

PART TWO

(Answer any **four** questions**)**

5.

a) Write the C Statements (all necessary statements) that open the file inf.dat for reading, and open the file outf.dat for writing.

b) Write the C program to write

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to the file outf.dat.

c) Write a C program that reads integers from the file scores.dat. After all the integers have been read, the program writes the sum of all the nonnegative integers to the video display. Assume that the file scores.dat contains at least one integer.

(5+4+6)

6.

a) Write a 'C' program to calculate and display the monthly income of a salesperson corresponding to the value of monthly sales input in the scanf() function, let us consider the following commission schedule: (**Note: use if-else statement**)

Monthly Sales	Income
Greater than or equal to Rs.50,000	375 plus 16% of sales
Less than Rs. 50,000 but Greater than or equal to Rs. 40,000	350 plus 14% of sales
Less than Rs. 40,000 but Greater than or equal to Rs. 30,000	325 plus 12% of sales
Less than Rs. 30,000 but Greater than or equal to Rs. 20,000	300 plus 9% of sales
Less than Rs. 20,000 but Greater than or equal to Rs. 10,000	250 plus 5% of sales
Less than Rs. 10,000	200 plus 3% of sales

b) What is printed after execution of each of the following C-programs?

1.
```
void main()
    {
    float reals[5];
    *(reals+1) = 245.8;
    *reals = *(reals + 1);
    printf(" %f", reals[0] );
    }
```

2.
```
void main( )
    {
    int nums[3];
    int *ptr = nums;
    nums[0] = 100;
    nums[1] = 1000;
    nums[2] = 10000;
    printf( "%d\n", ++*ptr );
    printf(   "%d", *ptr );
```

```
}
```

3.
```
void main()
    {
    int digit = 0;
    while (digit <= 9)
            printf( "%d\n", digit++);
    }
```

4.
```
void main()
    {
    int a=7, b=6;
    fun1(a,b);
    printf("\n a is %d  b  is %d", a, b);
    }

    int fun1(int c,int d)
    {  int e;
            e = c * d;
            d = 7 * c;
            printf(:\n c is %d  d is %d  e is %d", c, d, e);
            return;
    }
```

(7+[2x4])

7.

a) Write a C function word_count() to count the number of words in a given string and then call in Main().

b) Write a C function print_upper() to prints its character argument in uppercase.

c) Write a macro that clears an array to zero.

(7+4+4)

8.

a) What is a Structure? Define a structure that contains the following members:

i) An integer quantity called *acct_no*

ii) A character called *acct_type*

iii) A 40-element character array called *name*

iv) A floating-point quantity called *balance*

v) A structure variable called *lastpayment*, of type *date*: defined as an integer called *month*; an integer called *day*; an integer called *year*

vi) Include the user_defined data type *account* within the definition.

vii) Include structure variable *customer*, which is 100-element array of structures called account.

b) What is Pointer in C? How Pointers and Arrays are related?

(8+7)

9. Write short notes on any **three** of the following:

a) Switch statement (give proper syntax and examples)

b) What do you mean by Loop? How while-loop and do-loop differs?

c) What is C Preprocessor? Explain any two C preprocessor commands with example.

d) Break and Continue Statements

(3x5)