B1.3-R4: PROGRAMMING AND PROBLEM SOLVING THROUGH 'C' LANGUAGE

NOTE:

> ***IMPORTANT INSTRUCTIONS:***
>
> 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 **OMR ANSWER SHEET** only, supplied with 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 "OMR" answer sheet supplied with the question paper, following instructions therein.** **(1x10)**

1.1 Which one is incorrect statement for C Language?
A) C does not perform any bound checking in array.
B) Two pointers cannot be added.
C) String with white space cannot be entered by any means.
D) All arithmetic operators can be used as shorthand operators.

1.2 What will be the output of the following code?
```
void fun(int x,int *y){x++;*y=x+x;}
main()
{
  int b=4,a=1;
      fun(3,&b);
      printf("%d %d",a,b);
}
```
A) 1 4
B) 1 8
C) 4 1
D) 8 1

1.3 Which one of the following is incorrect statement for singly linked list?
A) The link field always points to successor.
B) To access any arbitrary data is time consuming.
C) When number of elements is fixed, it is better to use linked list than array.
D) It is a dynamic data structure.

1.4 Which option is the most appropriate for the following code?
```
main()
{
   char c[10]="INDIAN"; int x;
   for(x=4;x<7;x++)
        printf("%*s",x,c);
}
```

A) INDIANINDIANINDIAN
B) Compiler generates error because of not sufficient space.
C) INDIINDIAINDIAN
D) Error because of invalid printf syntax.

1.5 Calculate number of iterations of while loop in the following code:

```
main()
{
        float d=3.14;
        short int b=1,c=4;
        while(b<c)
        {
                b=(int)d;
                --b;
                c=c+1/2;
                printf("%d %d\n",b,c);
        }
}
```

A) Infinite times
B) Syntax error
C) 3
D) None of the above

1.6 What will be the output of the following code?

```
main()
  {
    int o=1%2,p=sizeof(float);
    int q,r=5,s=10/2,t;
    q=r>>2 && p>31-12%4 || r/q+3;
    t=(p>q)?(s*r-2):(o/4%2);
    printf("%d %d",o,s);
  }
```

A) Syntax error due to unbalanced parenthesis.
B) Syntax error due to value of q cannot be calculated.
C) 1 5
D) 0 5

1.7 Which one is the binary operator group?
A) Conditional operator, bitwise XOR
B) << , += , dot
C) indirection, ! , ~
D) (int), ++

1.8 What will be the output of the following code?

```
main()
{
        int a,b;
        a=3%4;
        switch(a/1)
        {
                default:printf("I");
                case 3:printf("T");
                case 2:printf("W");
                case 1:printf("O");
        }
}
```

A) ITWO
B) TWO
C) Syntax error because *break* is missing
D) Syntax error because *default* is misplaced

1.9   Which one of the following is incorrect for structure?
A)   It is a convenient tool to handle a group of logically related data items.
B)   Structure of array variables can be passed as argument in a function.
C)   It is a user-defined data type.
D)   Structure within structure is not supported.

1.10   Which one of the following is VALID in C language?
A)   printf("%d", ++4);
B)   float n, a[n];
C)   int *p=&a, a=3;
D)   for(; ;);

2.   Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the "OMR" answer sheet supplied with the question paper, following instructions therein.   (1x10)

2.1   The formal arguments must be always variables.

2.2   There is only one ternary operator in C.

2.3   malloc( ) is used to allocate memory run time.

2.4   sizeof is function that returns size of variables in bytes.

2.5   int a[4]; Here 4 indicates size of an array and a[4]=3; here 4 represents 5th element.

2.6   In self-referential structure, pointer is required as a data member.

2.7   Union is a concept borrowed from array.

2.8   default keyword is mandatory in switch case structure.

2.9   If the file is open in read mode, we can't insert data into the file.

2.10   In terms of memory usage, linked list is always better than array.

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 "OMR" answer sheet supplied with the question paper, following instructions therein.** **(1x10)**

	X		Y
3.1	It is the default storage class of a variable	**A.**	integer
3.2	Smallest individual unit in a program is known as	**B.**	strcat
3.3	This loop is also known as exit-controlled loop	**C.**	auto
3.4	"2" is known as	**D.**	C tokens
3.5	This character is used to indicate end of the FILE is	**E.**	do…while
3.6	Control string required to print long int	**F.**	strcmp
3.7	Default return type of any user-defined function is	**G.**	EOF
3.8	This function is used to merge two strings in one	**H.**	array
3.9	It is a fixed size collection of similar data type	**I.**	binary
3.10	Logical NOT operator is	**J.**	Character
		K.	%ld
		L.	String constant
		M.	Unary

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 "OMR" answer sheet supplied with the question paper, following instructions therein.** **(1x10)**

A.	void pointer	**B.**	linker	**C.**	enum
D.	fseek	**E.**	typedef	**F.**	semicolon
G.	unsigned int	**H.**	process	**I.**	address
J.	linked list	**K.**	condition	**L.**	ampersand
M.	asterisk				

4.1 Diamond shape is used to show _____ in a flowchart.

4.2 Data type of address of a variable is always _____.

4.3 _____ combines one or more object files and library code into executable file.

4.4 _____ function is required to access data in a file in random manner.

4.5 _____ keyword is used to declare user-defined data type.

4.6 Structure definition must ends with _____.

4.7 If the memory is not allocated run time, malloc( ) returns _____.

4.8 _____ is better to store data in application when frequent insertion and deletion operations are performed in application.

4.9 _____ symbol is used to indicate address of a variable.

4.10 _____ allows users to define an identifier that would represent an existing data type.

PART TWO
(Answer any **FOUR** questions)

5.
a)   Write a program that input a string and rearrange all the characters in alphabetical order.
b)   Discuss the differences between actual and formal arguments using example.
c)   How an array can be passed as an argument to a user-defined function?

(6+4+5)

6.
a)   Define structure **employee** having members: empid, name, basic, ta, da, hra, total salary. Write a program that inputs empid, name and basic salary for 5 employees. Calculate the total salary from data and display it along with ID and name.
(da=90% of basic, hra=10% of basic, ta=800)
b)   Write a program to that asks filename from the user and create it. Using program insert text data into the file and display the contents of the file on screen.

(8+7)

7.
a)   Write a menu driven program that first display options given below and asks to select an option. If user opts
1.   then check whether the number is perfect number or not
2.   then check whether the number is palindrome or not
3.   then immediately terminate the program.
(A positive integer that is equal to the sum of its positive integral factors, including 1 but excluding itself. A palindrome number is a number that remains the same when its digits are reversed.)
b)   Write a program that enters a binary number and calculate its decimal equivalent. (Fox example 10010=18)

(10+5)

8.
a)   Write a program to calculate nCr. Define and Use fact( ) function to calculate factorial of a number. $nCr = n! / ((r!) \times (n-r)!)$
b)   Describe the various methods to input string from keyboard.
c)   What is Command Line Argument? Give example through 'C' program.

(6+4+5)

9.
a)   Grades of steel is assigned according to the following conditions:
1.   Hardness must be > 50
2.   Carbon content must be > 0.7
3.   Tensile strength must be > 5500
The grades are as follows:
     If all the conditions are met then Grade is 10.
     If conditions 1 and 2 are met then Grade is 9.
     If conditions 2 and 3 are met then Grade is 8.
     If conditions 1 and 3 are met then Grade is 7.
     If none of the conditions are met then Grade is 6.
Write a program that asks values of hardness, carbon content and tensile strength of the steel. Output the Grade of steel.
b)   Explain the concept of structured programming in detail.
c)   Differentiate: local variable vs global variable.

(6+5+4)