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 The operator & is used for
A) Bitwise AND
B) Bitwise OR
C) Logical AND
D) Logical OR

1.2 Built-in data structures in 'C' are
A) Arrays
B) Structures
C) Files
D) All of the above

1.3 The size of a character variable in 'C' is
A) 4 byte
B) 8 bytes
C) 16 bytes
D) None of the above

1.4 What is the output of the following program segment?

```
#include<stdio.h>
   main()
      {
     int i=10, m=10;
           clrscr();
           printf("%d", i>m?i*i:m/m,20);
     getch();
       }
```

A) 20
B) 1
C) 120
D) 100 20

1.5 Data type of the controlling statement of a SWITCH statement cannot of the type:
A) int
B) char
C) short
D) float

1.6 How long the following loop runs:

```
for (x=0; x=3; x++)
```

A) Three time
B) Four times
C) Forever
D) Never

1.7 An expression contains assignment, relational and arithmetic operators. If parentheses are not specified, the order of evaluation of the operators would be:
A) assignment, arithmetic, relational
B) relational, arithmetic, assignment
C) assignment, relational, arithmetic
D) arithmetic, relational, assignment

1.8 The CONTINUE statement cannot be used with
A) for
B) switch
C) do
D) while

1.9 Output of the following program will be:

```
main(  )
{
   int a [  ] = {1, 2, 9, 8, 6, 3, 5, 7, 8, 9};
   int  *p = a+1;
   int  *q = a+6;
   printf ("\n%d", q-p);
 }
```

A) 9
B) 5
C) 2
D) None of the above

1.10 Size of the following union (assume size of int=2; size of float=4 and size of char = 1):

```
union Jabb
{
   int  a;
   float b;
   char c;
};
```

A) 2
B) 4
C) 1
D) 7

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 Scalar data types are not supported by 'C' language.
2.2 'C' language allows arrays of any dimensions.
2.3 A structure cannot be read as a single entity.
2.4 The associativity of operator **!** is from left to right. .
2.5 J++ executes faster than J+1 because ++ is faster than +.
2.6 Two structures cannot be compared automatically.
2.7 The code "a[i] = i++;" is valid and will execute.
2.8 Arrays automatically allocate space when declared.
2.9 sizeof('a') is not 1.
2.10 Float value can be added to a pointer.

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	The operator && is an example of	**A.**	Arrays
3.2	Preprocessor commands are always preceded by	**B.**	Storage class
3.3	Header files in 'C' contain	**C.**	/0
3.4	Structures in 'C' can be used with	**D.**	Shifting bits
3.5	Static defines a	**E.**	#
3.6	Null character is represented by	**F.**	string.h
3.7	File manipulation functions are available in	**G.**	Masking
3.8	An example of unconditional control structure is	**H.**	Switch statement
3.9	Header file required for strcpy	**I.**	Logical
3.10	The bitwise AND operator is used for	**J.**	#define
		K.	Macro definitions
		L.	stdio.h
		M.	Goto
		N.	strcpy
		O.	Library functions

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.	integer array	**B.**	pointers	**C.**	program
D.	printf( ) and scanf( )	**E.**	character array	**F.**	&&
G.	function	**H.**	Main	**I.**	getw( )
J.	reference, value	**K.**	static	**L.**	for
M.	extern	**N.**	ternary	**O.**	register
P.	putw( )	**Q.**	main( )		

4.1 Formatted I/O can be produced with the routine(s) _____.

4.2 The _____statement is used to loop as long as a specified condition is met.

4.3 To create a string variable, me must declare a(n) _____ with enough elements to contain the entire string.

4.4 Call by _____ is more efficient than call by file.

4.5 **exit( )** function is used to terminate the _____.

4.6 The only operator that contains three operands is _____ operator.

4.7 The declaration _____ does not allocate storage space for variable.

4.8 The function _____ reads an integer from a file.

4.9 All buffers are cleared when a _____ closed.

4.10 Preprocessor directives are placed in the source program before the function _____.

PART TWO

(Answer any **FOUR** questions)

5.

a) What are the commonly used input functions in 'C'? Write their syntax and explain the purpose of each.

b) Develop a flowchart and then write a program to compute the roots of a quadratic equation A*X^2 + B*X + C = 0. Allow the possibility that (B^2 – 4*A*C) <= 0.

(6+9)

6.

a) What are logical, syntactic and execution errors? Give examples of each. Which is most difficult to find and why?

b) Enumerate features of a good 'C' program. Describe the commonly used techniques as to how 'C' programs can be made highly readable and modifiable.

c) What is an algorithm? Develop an algorithm to test whether a given number is a prime number.

(5+5+5)

7.

a) Develop loops using

i) While statement

ii) Do-while statement

iii) For statement

that will calculate the sum of every third integer, beginning with k=2 for all values of k <= 100.

b) Write a function that will compute

Y = X^n

Where Y and X are floating point numbers and n is an integer number. Use this function and print the output

X	n	Y
…	…	…

Check for possible exceptions that may occur during computations with regard to the magnitude of computed values.

(6+9)

8.

a) How does an array differ from a structure? Give and explain the syntax of array and structure as defined in 'C'.

b) How are one-dimensional and two-dimensional arrays stored in computer memory? Illustrate with an example.

c) Develop a program to multiply two matrices with sizes 3x4 and 4x5. Your program should take care of the fact that no element of either matrix can be negative. Include appropriate documentation.

(6+2+7)

9.

a) Give the main advantage of storing data as a file. Describe various ways in which data files can be categorized in 'C'. Illustrate by examples.

b) What is an indirection operator? Explain its usage to access a multidimensional array element. Illustrate your answer by an example.

c) 'C' compiler supports many pre-processor commands. Write their names only.

(6+6+3)