

## M3-R4: 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 **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 of the following function declaration need not have a return statement in its body?

- A) int a(char \*s)
- B) void b(int a[], int n)
- C) float \*c()
- D) short d(long x)

1.2 Identify the correct sequence of steps to run a program

- A) link, load, code, compile and execute
- B) code, compile, link, execute and load
- C) code, compile, link, load and execute
- D) compile, code, link, load and execute

1.3 What will be the output of the following code segment?

```
char *p = "Structured Programming";  
printf("%s", p + 5);
```

- A) Structured Programming
- B) tured Programming
- C) ctured Programming
- D) There will be no output as there is a syntax error in code

1.4 Which of the following is an incorrect syntax?

- A) 

```
void outerFn() {  
    ...  
    int innerFn(float f) {  
        ...  
    }  
}
```
- B) 

```
struct outer {  
    ...  
    struct inner {  
        ...  
    }I;  
};
```

- C) `if (i < 10) {`  
     `...`  
     `if (x == y) {`  
         `...`  
     `}`  
     `...`  
`}`
- D) `for (i = 0; i < 10; i++) {`  
     `...`  
     `for (j = 0; j < 10; j++) {`  
         `...`  
     `}`  
`}`

1.5 For the following definitions  
`char a[] = "Hello World!";`  
`int i;`  
 Which of the following loop will print the output as *Hello World!*

- A) `for (i = 0; a[i] != '/0'; i++)`  
     `printf("%s", a[i]);`
- B) `for (i = 0; a[i] != '/0'; i++)`  
     `printf("%c", a[i]);`
- C) `for (i = 0; a[i] != '\0'; i++)`  
     `printf("%s", a[i]);`
- D) `for (i = 0; a[i] != '\0'; i++)`  
     `printf("%c", a[i]);`

1.6 Consider the statement given below:  
`int a[5] = {1, 2, 3, 4, 5}, *p = a;`  
 Which *printf* statement will print the value of fourth element of the array?

- A) `printf("%d ", *(p + 3));`
- B) `printf("%d", p[4]);`
- C) `printf("%d ", a + 3);`
- D) `printf("%d ", *a + 3);`

1.7 What will be the output of the following code segment?

```
int x = 24, y = 39, z = 45;
z = x + y;
y = z - y;
x = z - y;
printf("\n%d %d %d", x, y, z);
```

- A) 24 39 63
- B) 39 24 63
- C) 24 39 45
- D) 39 24 45

1.8 Which of the following is the correct way to define a two dimensional array?

- A) `int a[ ][4];`
- B) `int b[2, 4];`
- C) `int c[2][ ];`
- D) `int d[ ][ 4] = {{1, 3, 5, 7}, {2, 4, 6, 8}};`

1.9 What will be the output of the following code segment if *Hello there* is given as input?

```
char a[20];
scanf("%s", a);
printf("%s", a);
```

- A) Hello there
- B) Hello
- C) "Hello there"
- D) "Hello"

1.10 What will be the output of the following code segment?

```
void fn() {
    static int i = 10;
    printf("%d ", ++i);
}
main() {
    fn();
    fn();
}
```

- A) 10 10
- B) 11 11
- C) 11 12
- D) 12 12

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 A *printf* statement can be used to display output on different lines.

2.2 # is used to insert comments in the program.

2.3 The statement *fopen("data.txt", "w+")* will open a file named *data.txt* for both reading and writing.

2.4 Structures can have bit fields.

2.5 If no storage class is mentioned for a variable defined in a function then it is by default *auto*.

2.6 It is necessary to have *default* case in a *switch* statement.

2.7 A *continue* statement must be enclosed in a loop.

2.8 The names of parameters in a function definition and its declaration must be same.

2.9 *sizeof()* is a function used to determine the amount of memory occupied by a variable.

2.10 The address of the variable is passed to a function in call by reference.

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	Terminates program	A.	union
3.2	Calls itself	B.	Typecasting
3.3	Dynamic memory allocation	C.	strcmp()
3.4	Space for one member only	D.	"%[\n]"
3.5	Explicit conversion	E.	fseek()
3.6	p -> member_name	F.	exit()
3.7	File pointer movement	G.	Recursive functions
3.8	String comparison	H.	Array
3.9	Unary operator	I.	++
3.10	Reading line with <i>scanf()</i>	J.	malloc()
		K.	(*p).member_name
		L.	Structure
		M.	fabs()

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.	goto	B.	break	C.	++
D.	structure	E.	do...while	F.	Linked lists
G.	infinite	H.	%.10s	I.	continue
J.	int	K.	Array	L.	fprintf
M.	pointer				

- 4.1 \_\_\_\_\_ is used to club variables of different data types as a unit.
- 4.2 It is necessary to have a pointer to the next node in \_\_\_\_\_.
- 4.3 \_\_\_\_\_ loop is executed atleast once.
- 4.4 If there is no test condition in a *for* loop then it becomes a(n) \_\_\_\_\_ loop.
- 4.5 Avoid the use of \_\_\_\_\_ statement in the program.
- 4.6 An operator which can change the value of a variable on the right hand side of an expression is \_\_\_\_\_.
- 4.7 If a function is defined as *fn(char a){ ... }*, then its return type is \_\_\_\_\_.
- 4.8 Format code in printf to print exactly 10 characters is \_\_\_\_\_.
- 4.9 A \_\_\_\_\_ variable stores the address of another variable.
- 4.10 \_\_\_\_\_ can be used to write in a file.

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

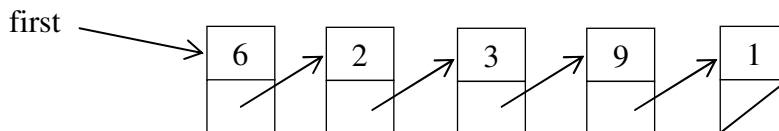
- 5.
- a) Write a function which accepts an array of size  $n$  containing integer values and returns average of all values. Call the function from main program.
  - b) Draw a flowchart to print the factorials of numbers from 1 to  $n$  where  $n$  is entered by user.
  - c) Write a function to display the multiplication table of the number.

**(5+5+5)**

- 6.
- a) Write a program to determine the sum of the following series:  
$$S = 1 - 3 + 5 - 7 + \dots n$$
Read the value of  $n$  from the user.
  - b) The '\*' symbol is used for two different purposes in pointer data type. Explain them.
  - c) Write a function that returns 1 if the two matrices passed to it as argument are equal and 0 otherwise.

**(5+5+5)**

- 7.
- a) Write a program to copy a file into another file.
  - b) Given the linked list:



Show how the linked list will appear after every operation (as mentioned below) is carried out. Assume that the operations are carried out one after another.

```
addAtHead(5);
addAtHead(4);
addAfter(3, 7); // 7 is to be added after 3
delete(5);
```

**(7+8)**

- 8.
- a) Write a program which asks the user to enter the name and age of persons in his group. The numbers of persons is not known to the user in the beginning of the program. The user keeps on entering the data till the user enters the age as zero. The program finally prints the average age.
  - b) Write a program to display all the prime numbers between two positive integers  $m$  and  $n$ . The values of  $m$  and  $n$  are to be taken from the user.

**(8+7)**

- 9.
- a) Using a switch statement, write a function to count the number of vowels and number of blanks in a character array passed to it as an argument.
  - b) Define a structure of student with the following fields: rollNo, name and marks. Write a program to read and store the data of at most 30 students in an array. Also display the average marks of the students.

**(6+9)**