

## 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 **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. (1x10)
  - 1.1 What would be value of j after the following is executed?  

```
k=17;  
j=6;  
if (k < 10)  
    j=8;  
    j=j+1;  
j=j+2;
```

A) 8  
B) 9  
C) 7  
D) 10
  - 1.2 What will be output after compilation and execution of the following code?  

```
#include<stdio.h>  
int main(){ int array[3]={5}; int i;  
for (i=0;i<=2;i++)  
printf("%d ",array[i]); return 0;}
```

A) 5 garbage garbage  
B) 5 0 0  
C) 0 0 0  
D) 5 5 5
  - 1.3 In an assignment statement a=b; which of the following statement is true?

A) The variable a and the variable b are same.  
B) The value of b is assigned to variable a but if b changes later, it will not effect the value of variable a.  
C) The value of b is assigned to variable a but if b changes later, it will effect the value of variable a.  
D) The value of variable a is assigned to variable b, and the value of variable b is assigned to variable a.

1.4 Which code will print k 20 times?

- A) 

```
for (i=1; i < 20; i++)  
    printf ("k");
```
- B) 

```
for (i=1; i = 20; i++)  
    printf ("k");
```
- C) 

```
for (i=0; i < 20; i++)  
    printf ("k");
```
- D) 

```
for (i=0; i <= 20; i++)  
    printf ("k");
```

1.5 When the following piece of code is executed, what happens?

- ```
b = 3; a = b++;
```
- A) a contains 3 and b contains 4
  - B) a contains 4 and b contains 4
  - C) a contains 4 and b contains 3
  - D) a contains 3 and b contains 3

1.6 What is the value of r after this code is executed?

- ```
r=2;  
k=8;  
if (r>3 || k>6 && r<5 ||k>10)  
    r=9;  
else  
    r=6
```
- A) 9
  - B) 2
  - C) 6
  - D) 8

1.7 Which of the following is not a valid relational operator?

- A) <
- B) =
- C) >=
- D) <=

1.8 What is the final value of x when the code `int x; for(x=0; x<10; x++) {}` is executed?

- A) 10
- B) 9
- C) 0
- D) 1

1.9 For the function

```
int operation (int A[], int n)  
{  
    ...  
    ...  
}
```

Which is the appropriate calling statement from main program?

- A) `s=operation(A[], 6)`
- B) `operation(A, 6)`
- C) `k=operation(A, 6)`
- D) `d=operation(int A, 6)`

1.10 Which is an incorrect variable name?

- A) Id\_No
- B) ID\_NO
- C) IdNo
- D) Id No

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. (1x10)

2.1 The index of an array starts from 1.

2.2 Task of continue keyword is to transfer the control of program at the next step of the loop.

2.3 Every variable in c have three most fundamental attributes: Name, Value, Address.

2.4 It is guaranteed that the while loop will be executed at least once.

2.5 All of the following are valid expressions in C.

```
If a ( = 6) b = 5;
```

```
a = b = c = 5;
```

```
a = 11 % 3
```

2.6 In 'C', parameters to a function can be passed by value but not by reference.

2.7 Changes made to an array inside a function are automatically reflected in calling program.

2.8 The operating system converts the 'C' program into machine language.

2.9 Every function in 'C' must have a “return” statement.

2.10 C is an object oriented programming language.

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. (1x10)

| X    |                              | Y  |  |
|------|------------------------------|----|--|
| 3.1  | size of void pointer in byte | A. | p is pointer to an array of integer  |
| 3.2  | p[i] can be written as       | B. | joins two strings  |
| 3.3  | Union                        | C. | returning a pointer to the beginning of the block  |
| 3.4  | malloc()                     | D. | compares two strings   |
| 3.5  | recursion                    | E. | a dynamic data structure   |
| 3.6  | int(*p)[10]                  | F. | two  |
| 3.7  | structure                    | G. | can be used to create variables of old types   |
| 3.8  | linked list                  | H. | replaces one string by the other   |
| 3.9  | strcmp()                     | I. | is a memory location that is used by several different variables, which may be of different type         |
| 3.10 | strcat()                     | J. | *(p + i)   |
|      |                              | K. | is different memory location that is used by several different variables, which may be of different type |
|      |                              | L. | a function calling itself  |
|      |                              | M. | allocate and clear memory  |

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. (1x10)

|           |              |           |                   |           |       |
|-----------|--------------|-----------|-------------------|-----------|-------|
| <b>A.</b> | bit          | <b>B.</b> | text              | <b>C.</b> | void  |
| <b>D.</b> | byte         | <b>E.</b> | string            | <b>F.</b> | fputc |
| <b>G.</b> | preprocessor | <b>H.</b> | logical operators | <b>I.</b> | fputs |
| <b>J.</b> | char         | <b>K.</b> | unstructured      | <b>L.</b> | getc  |
| <b>M.</b> | 0's and 1's  |           |                   |           |       |

- 4.1 Ultimately, all data items processed by a computer are reduced to combinations of \_\_\_\_\_.
- 4.2 \_\_\_\_\_ are used when we want to test more than one condition and make a decision.
- 4.3 If a function return type is declared as \_\_\_\_\_ it cannot return a value.
- 4.4 Function \_\_\_\_\_ writes a character to a specified file.
- 4.5 Function \_\_\_\_\_ writes a line to a specified file.
- 4.6 A group of related characters that conveys meaning is called a \_\_\_\_\_.
- 4.7 Most information stored in computer systems is stored in \_\_\_\_\_ files.
- 4.8 The smallest data item a computer can process is called a \_\_\_\_\_.
- 4.9 The \_\_\_\_\_ is a program that is executed before the source code is compiled.
- 4.10 If the pointer variable ptr holds the address of a char, the data type of \*ptr will be \_\_\_\_\_.

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

- 5.
- a) Write a function which accepts an array of size n containing integer values and returns the average of all values. Call the function from main program.
  - b) Write a function that takes time in seconds as input and prints it in terms of hours, minutes and seconds.
  - c) Write a function which accepts an integer array of size n and prints every third value of the array.

**(5+5+5)**

- 6.
- a) What is difference between pass by value and pass by reference?
  - b) Write a C program which calls a function to swap values of two variables.

**(7+8)**

- 7.
- a) What is the output of the following program?

```
#include<stdio.h>
void fun(int*, int*);
int main()
{
    int i=5, j=2;
    fun(&i, &j);
    printf("%d, %d", i, j);
    return 0;
}
void fun(int *i, int *j)
{
    *i = *i**i;
    *j = *j**j;
}
```

- b) Write and explain the action of **WHILE** statement. Develop a program in 'C' language to compute the average of every third integer number lying between 1 and 100. Include appropriate documentation.
- c) Write a function which receives two integer arrays and creates a third array by multiplying corresponding elements (elements with same index) and returns it to main program.

**(5+5+5)**

- 8.
- a) Write a c program to find out factorial of given number using function recursion.
  - b) Write a program which asks the user a number between 1 and 7 and prints the corresponding day of the week. (1: Sunday, 2: Monday, ...)
  - c) Write a program in 'C' which asks a user to input integers in an array of size 20. It then arranges the elements in decreasing order and prints the array.

**(5+5+5)**

- 9.
- a) Write a program which asks the user to enter the name and age of persons in his group. The number 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 which asks for a integer from the user. It reverses the integer and prints "same" if after reversal the number is same as old number otherwise it prints "not same".

**(8+7)**