M.Sc. First Semester End Examination, 2023

(Regular & Supplementary Paper)

Applied Mathematics with Oceanology and Computer Programming

MTM – 104

(ADVANCED PROGRAMMING IN C AND MATLAB)

Full Marks: 50 ***Time: 02 Hrs***

The figures in the right hand margin indicate mark.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary

1. Answer any four questions **4x2=8**

a) Find the output of the following statements,

```
main ( )
{ int k,a; a=10;
for (k=1; k<10; k++)
{if (k%2= =1)
    a = a+k;
    Else
    a=a-1;
printf(" a = %d\", a);
break;}
printf ("The value of a=%d\n",a);
}
```

b) What is the difference between 'putc and 'putw' function in C?.

c) Write a program in MATLAB to add e ther two arrays .

d) Describe the types of variables in M \TLAB according to their scopes in two.

e) What is the difference between getc : nd getw functions in C?.

f) Give the syntax of for loop and explai how it works.

2. Answer any four questions **4x4=16**

a) Write a program to swap two variable : sing pointers.

b) How is a multidimensional array de ined in terms of an array of pointers? What does each po nter represent? How elements can be accessed in this case?

c) i) $(2A9F)_{16} = (?)_{10}$

ii) $(1011010011011010)_2 = (?)_{16}$

d) The exponential power of x is a proximated by the following infinite series $e^x = 1 + x + \frac{x}{2} + \frac{x^3}{2!} + \ldots\ldots$. Write a program in C to find out how many te ms will be sufficient in the right-hand side of the given exp ession to ensure that the result is within the 5% error of the e xact value. 4

e) What do you mean by recursive function? Write a function in MATLAB to find the value of a determinant of any order recursively. 4

f) Give an example of array of pointers and pointers to pointers.

3. Answer any two questions **2x8=16**

a) What is difference between Array and structure? Write a C-program to calculate the area of circle, rectangle or triangle depending upon the user's choice using structures. 3+5

b) Write a program in MATLAB to find mean, median, variance and standard deviation of an input array or a matrix. 8

c) What is a self-referential structure? For what kinds of applications are self-referential structures useful? Write a program in C to construct a linked list containing three components, where each component consists of two data items: a string and a pointer that references the next component within the list. 1+1+6

[Internal Marks – 10]