INSTRUCTION: ANSWER ALL QUESTIONS. EACH QUESTION CARRIES 20 MARKS.

Question 1

a) What is the output of the following program if the input is 97? **[20 MARKS]**

```
#include <stdio.h>
#include <conio.h>
int main()
{
   int x;
   char y;
   printf("\n Please enter a number: ");
   scanf("%d", &x);
   y=++x;
   printf("\n The answer is: %c", y++);
   printf("\n The answer is: %c", - -y);
   printf("\n The answer is: %c", ++y);
   printf("\n The answer is: %d", y- -);
   return 0;
}
```

(6 marks)

b) What is the output of the following program? Show exact placing of space characters.

```
#include <stdio.h>
int main()
{
        int i, j=1;
        for (i=j ;  j<5 ;  i+=2, j+=1) {
                printf("\n Round %d: ", i);
                printf("i=%d \t j= %d \n", i-j,  i+j);
                }
return 0;
}
```

(8 marks)

c) Identify and correct any **SIX (6)** errors in the program below. (*Note: There may be more than one error per statement*)

```
include stdio.h
int main
(
   int num =2;
   switch(num+2);
   {
     case one
      printf("Case1: Value is: %d", num);
     case two
      printf("Case1: Value is: %d", num);
     case three
      printf("Case1: Value is: %d", num);
     default
      printf("Default: Value is: %d", num);
  }
  return 0;
)
```

(6 marks)

Question 5 **[20 MARKS]**

a) Write a complete C Program for the following algebra expressions. The program prints the value of N. The program gets the value of a, b, and c from the input. Note: if the divisor of the division is zero, the program should display error.

$$N = \frac{a^2 - c^2}{a + b - c} + c$$

(10 marks)

b) Write a C program to read two integers from the input and swap the values using pointers. (10 marks)

b) What is the output of the following program if the input is 65?

```
#include <stdio.h>
#include <conio.h>
int main( )
{
   int a, b=1;
   char c;
   printf("\n Please enter a number: ");
   scanf("%d", &a);
   b+=a;
   c= - -b;
   printf("\n The value of b is: %d", b);
   printf("\n The value of c is: %d", - -b);
   printf("\n The value of c is: %c", ++b);
   return 0;
}
```

(6 marks)

c) What is the output of the following program? Show exact placing of space characters.

```
#include <stdio.h>
int main()
{
        int i,j;
        for (i=1,j=i ;  j<5 ;  i+=2, j+=1) {
                printf("\n Cycle %d: ", i);
                printf("i=%d \t j= %d \n", i, j);
                }
return 0;
}
```

(8 marks)

Question 3 **[20 MARKS]**

Write a C program to get two characters from the input and pass to a function. Then the function checks these two characters and performs the following tasks:

- If one character is lowercase and the other one is uppercase, the program prints "There is exactly one lowercase and one uppercase character".
- If both characters are lowercase, the program prints "Both are lowercase".
- If both characters are uppercase, the program prints "Both are uppercase".

(20 marks)

Question 4 **[20 MARKS]**

a) Write a C program using nested *for loop* to produce the following output:

```
12   8   4
 9   6   3
 6   4   2
 3   2   1
```

(10 marks)

b) Write a C program to find factorial of a number (n).
Note: for a positive integer n, factorial = 1*2*3...n

(10 marks)

Question 1

[20 MARKS]

a) Describe the following UNIX commands at user level:

i) pwd (2 marks)

ii) kill (2 marks)

iii) ps (2 marks)

iv) cat (2 marks)

v) grep (2 marks)

vi) man (2 marks)

vii) apropos (2 marks)

viii) clear (2 marks)

b) Suppose the access permissions of "file.c" are –rwxrw- - -x.

i) Explain user, group, and other permissions of "file.c". (2 marks)

ii) Write down the steps and command to change the permissions to read only permissions for all user, group, and others. (2 marks)

Question 2

[20 MARKS]

a) Identify and correct any **SIX (6)** errors in the program below.

```
#include <stdio.h>
int main()
{
  int base; exponent;
  long result == 1;
  printf("Enter a base number: ");
  scanf("%f", base);

  printf("Enter an exponent: ");
  scanf("%d", exponent);
  while (exponent != 0);
  {
    result =* base;
    - - exponent;
  }
  printf("Answer = %ld", result);
  return;
}
```

(6 marks)

Question 5

[20 MARKS]

State appropriate UNIX command(s) to answer the following questions.

a) Create file "sample.c" (3 marks)

b) Search for the expression "include" in "sample.c". (3 marks)

c) Give execute permission only to the "sample.c" (3 marks)

d) Remove all execute permissions of the "sample.c" (3 marks)

e) Run "program" executable file and take input from "sample" file. (3 marks)

f) Move the contents of file1 and file2 into a single file3 (3 marks)

g) Get online help for ls command (2 marks)

[20 MA

Question 4

What will be the output of the following two C programs?

a) Suppose the input values are 1 and 3.

```
#include<stdio.h>
int main(void)
  {
   int arr[2], i;
   printf ("\n Enter two integers: ");
   for (i=0; i<2; i++)
     scanf ("%d", &arr[i]);
   printf ("\n The output is:\n");
   for (i=1; i>=0; i--)
     printf ("%4d", *(arr+i));
   printf ("\n");
   for (i=1; i>=0; i--)
     printf ("%4d", *(arr)+i);
  }
```

(9 marks)

b) Suppose the input is 1.

```
#include<stdio.h>
void func(int *x);
int main(void)
{
        int num;
        printf("\n Please Enter a number: ");
        scanf("%d", &num);
        func(&num);
        printf("\n The value of number is: %d\n", ++num);
        func(&num);
        printf("\n The value of number is: %d\n", --num);
        return 0;
}
void func(int *x)
{
        printf("\n The value in function is: %d", *x);
        *x = (*x) * (*x) * (*x);
}
```

(11 marks)

Question 1

[20 MARKS]

What will be the output of the following C programs?

a)

```
#include<stdio.h>
int main(void)
  {
   char s[11]="Final Exam", c[10]="May 2019";
   printf("\n %s\t%c%c%c\n", "C Programming ",'Example','x','1');
   printf(" %s\t%s", s,c);
   return 0;
  }
```

(8 marks)

b)

```
#include <stdio.h>
int main(void)
  {
   float a=5.000;
   int b=5;
   printf("\n%12.2f \n", a);
   printf("%9d.00 \n", b);
   printf("%17s \n", "This is a");
   printf("\tC example");
   printf("\n\t%d%d%d", b, b++, --b);
}
```

(12 marks)

Question 2

[20 MARKS]

a) Write a C program that prints the following output:

1	2	3	4
2	4	6	8
3	6	9	12
4	8	12	16

(10 marks)

b) Write a C program that takes two integer numbers and one operator (+ - * /) from the input and then performs the operator between the two values and prints the result.

(10 marks)

Question 3

[20 MARKS]

a) Write a C program that reads ten integer numbers from the input and saves it in a 2-by-5 array. Then, the program finds the minimum number value and prints the result.

(11 marks)

b) Write a C program for Q3a using single-subscribed array.

(9 marks)

[20 MARKS]

Question 2

Write a C program to get two integers from the input and pass to a function. Then the function asks the user to enter a character, and performs the following task based on the input character:

- If the user enters 'p', the program prints the addition of two integers.
- If the user enters 's', the program prints the subtraction of two integers.
- If the user enters 'm', the program prints the multiplication of two integers.
- If the user enters 'd', the program prints the division of two integers.
- If enter any other character, print "ERROR".

You must use *switch* multiple-selection. (20 marks)

[20 MARKS]

Question 3

a) Write a C program using nested *for loop* to produce the following output:

2	3	4	5
3	4	5	6
4	5	6	7

(10 marks)

b) Write a C program to read a character from the input and convert it to equivalent integer based on ASCII code. Repeat the process until press CRTL+C (EOF) using *while* loop.

Sample output:

```
Enter a character and I will show the equivalent integer: c
Equivalent integer value of c is 99
Enter a number and I will show the equivalent character: CRTL+C
END
```

(10 marks)

Question 4 [20 MARKS]

a) What is the output of the following C program if the input is 100011?

```
#include <stdio.h>
int main()
{
  int  num, bin, dec = 0, base = 1, rem;
  printf("Enter a binary number(1s and 0s): ");
  scanf("%d", &num);
  bin = num;
  while (num > 0)
  {
    rem = num % 10;
    dec = dec + rem * base;
    num = num / 10 ;
    base = base * 2;
  }
  printf("\n  The Binary number is = %d \n\n", bin);
  printf("  Its decimal equivalent is = %d \n", dec++);
  printf("\n  The Binary number is = %d \n\n", ++bin);
  printf("  Its decimal equivalent is = %d \n", dec);
}
```

(8 marks)

b) Write a C program to read two integers from the input, if two integers are not equal, then call a function to swap these values using pointers, and the swapped values should be displayed in the main function. If they are equal, display "These two integers are equal, no need to swap".

(12 marks)

Question 5 **[20 MARKS]**

a) Write an appropriate command in Linux for the following statements, assuming you are in your home directory (/home):

i) Create a new directory called "BIT" in your "home" directory.

(2 marks)

ii) Create a new file called "final.txt" in your "BIT" directory.

(2 marks)

iii) Move 'final.txt' file from "BIT" directory into "home" directory and rename to "resit.txt".

(3 marks)

iv) Add full permissions to 'resit.txt'.

(4 marks)

v) Show the contents of 'resit.txt' file located at /home.

(2 marks)

vi) Open 'resit.txt' file in an editor.

(2 marks)

b) Explain syntax error in C programming.

(2 marks)

c) List **SIX (6)** phases that C programs typically go through to be executed.

(3 marks)