Q1:

a: Write the following equation as a C++ expression and convert to program: (2 marks)

\[ f = \sqrt{\frac{\sin(x) - x^5}{\ln(x) + \frac{x}{4}}} \]

b: Write a C++ program to sort array 2-D and trace step by step with example. (4 marks)

c: Write C++ program that display the following board pattern: (4 marks)

```
 **** **** **** ****
  * * * * * * * * *
  * * * * * * * * *
  * * * * * * * * *
  * * * * * * * * *
  * * * * * * * * *
  * * * * * * * * *
  * * * * * * * * *
  * * * * * * * * *
  * * * * * * * * *
```

Q2:a: Write a C++ program, using function, to compute the number of zeros in the array 1-D. (3 marks)

b: Write C++ program, to replace the elements of the main diameter with the elements of the second diameter. (3 marks)

c: Write C++ program to apply the following instructions (4 marks)

```
iatoi (a)
fatof (a)
itoa (i, a, 10);
```
Q3: Answer only two (5 marks each one)
   a: Write C++ program to find the summation of the following series:
      \[ S = \frac{20}{20X} + \frac{18}{18X} + \frac{16}{16X} + \ldots + \frac{2}{2X} \]

   b: The Fibonacci Series is: 0, 1, 1, 2, 3, 5, 8, 13, 21, ... It begins with the terms 0 and 1 and has the property that each succeeding term is the sum of the two preceding terms. Write a C++ program to calculate the nth Fibonacci number.

   c: Find the sum of the following \( s = 1 + 3 + 5 + 7 + \ldots + 99 \).

Q4:
   a: Write C++ program to calculate the squared value of a number passed from main function. Use this function in a program to calculate the squares of numbers from 1 to 10. (3 marks)

   b: Write the function prototype for a function called exchange that takes two pointers to floating-point numbers \( x, y \) as parameters, swaps their values, and does not return a value. (5 marks)

   c: Write C++ program, using function, to inverse an integer number. (without using array, 2 marks)
   For example: 765432 \( \rightarrow \) 234567

Q5:
   a: convert condition statement to (if) condition. (5 marks)
   
   cout << ( x < y ? -1 : (x == y ? 0 : 1 ) );

   b: Write a C++ program for open exist file (aa.txt), and create file(bb.txt) to calculate the number of word in aa file and print the numbers to screen, copy all content aa to bb in small letter, and create new file (cc.txt), copy the content file bb puts in reverse order in cc. (5 marks)

Q6:
   a: Assume: \( X=0, Y=1, Z=1 \). Find the following expression: (5 marks)
   \[ M = x+++--y&&++z \]

   b: Write a C++ program to create structure of employees content (name, age, salary, job), to 60 employees, read information about employees, search of small salary and print the information about employer, sort the information by age(descending), print after sort. (5 marks)

- Good Luck -

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