Jetking
Better Life

Alliance with FPT Education

C/C++ Programming Fundamentals - Exam Paper
Duration: 90 minutes | Marks: 100

***Question*:**

1. A microcontroller reads temperature data from 10 sensors on an electronic board.
   Writing a program with requirements:
   - Input 10 temperature values (float) from keyboard.
   - Display values that exceed 50°C to the screen.
   - Calculate and print the average temperature of the sensors with values below 50°C.

2. A system has 5 DC motors, each with a speed stored in an array `int speed[5]`.
   Write a program to:
   - Input current speed values for 5 motors.
   - Write a function using pointers to find the motor with the highest speed, and display its index and value.
   - Write another function using pointers to increase the speed of all motors running below 1000 RPM by 10%.

   Hint:
   - Use `int*` to pass the array for maximum search.
   - Use `void adjustSpeed(int *arr, int size);` for speed adjustment.

3. A monitoring station manages multiple electronic devices. Each device has:
   - Device ID (string, max 10 characters)
   - Status (0: inactive, 1: active)
   - Technical Specifications:
     • Operating voltage (float)
     • Current consumption (float)
     • Operating time during the day (hours)

   Requirements:
   1. Define two `struct`: `TechnicalSpec` and `Device` (with nesting).
   2. Input data for `n` devices (use an array of `struct`).

3. Write a function to calculate the total daily energy consumption for each device (Formula: P = U * I * t, in Wh).

4. Print a list of active devices with consumption greater than 1000 Wh.

Marking Schema:

Question	**Mark**
Question 1	**20**
Question 2	**30**
Question 3	**40**
Bonus validate data and coding convention, complete programs	**10**
Total	**100**