**BECE320E Embedded C Programming**  **Digital Assignment – II**

**Fall Semester 2024-25**

Class Number: CH2024250102674 Submission date: 09-10-2024

Handwritten answers need to be scanned and uploaded to Teams.

Write your Reg. Number and Name on the top right corner of every page.

Give appropriate comments for the C programs.

The first 12 questions are common to all.

1. With a neat sketch, describe the functions of the pins of an 8051 microcontroller.
2. Explain the significance and contents of different special function registers of 8051.
3. Explain the various interrupts supported by 8051.
4. Explain bit-addressable and byte-addressable programming in 8051.
5. Write an embedded C program to send values 00 – FF to port P0 of 8051 with some delay using loops.
6. Assume a crystal frequency of 11.0592 MHz. Explain the procedure of calculating values to be loaded into 8051 timer registers in modes 1 and 2 based on the time delay required.
7. Write an 8051 C program to generate a 100 Hz clock signal from pin 0 of port 1 (P1.0). Use timer 0 in mode 1.
8. Write embedded C programs illustrating the usage of 8051 timers as counters.
9. Write and execute an 8051 embedded C program to create a clock of frequency 2500Hz on pin P2.7. Use timer 1, mode 2 to create the delay.
10. Write an 8051 C program to transmit serially “United we stand. ” continuously at a baud rate of 19200.
11. Write an 8051 C program using interrupts to get data from P1 and send it to P0, while timer 1 turns on and off an LED connected to P2.3 every 70 ms.
12. Write an 8051 C program to send a message “VIT-Chennai” to the serial port continuously. Assume a switch is connected to pin P1.3. Monitor its status and set the baud rate as follows.

SW = 0, 19200 baud rate

SW = 1, 4800 baud rate

Odd registration numbers

1. With relevant schematic and circuit diagram, briefly explain a wearable patch that measures glucose, pH, electrolytes, cortisol, and urea from sweat and transfers the data to a cloud.
2. Give the schematic and complete block diagram of an AI-enabled receptionist at a hotel who listens to users' queries and answers accordingly.
3. With relevant schematics, briefly explain, in the context of embedded systems, the modules involved in
4. Autonomous vehicles
5. Intelligent lighting systems
6. Home automation systems

Even registration numbers

1. Design an elderly care device that tracks the vital parameters and physical activities of joints of the human body and sends a report to a medical practitioner for analysis.
2. Sketch the schematic of a wearable device that monitors heart rate, blood pressure, oxygen level, and temperature and stores the data in the mobile via Bluetooth.
3. With relevant schematics, briefly explain, in the context of embedded systems, the modules involved in
4. Intelligent parking systems
5. IoT-based smart agriculture
6. Weather and air quality monitoring systems