Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50909

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fifth/Sixth Semester

Computer Science and Engineering

CS3691 – EMBEDDED SYSTEMS AND IoT

(Common to: Computer Science and Engineering (Cyber Security)/Artificial Intelligence and Data Science/ Computer Science and Business Systems/ Information Technology)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How register bank selected in 8051 microcontroller?

2. Compare pooling and interrupts. How a microcontroller performs upon activation of interrupts?

3. What is the difference between compiler and cross compiler?

4. List the bitwise operators in Embedded C language.

5. List the characteristics of IoT.

6. How debugging works in Arduino?

7. What is the requirement of IoT protocol standardization?

8. State where Zigbee makes it mark with regard to IoT applications when compared to Bluetooth and WiFi standards.

9. Define smart irrigation system.

10. What are the components used as the core of an embedded systems?

PART B — (5 × 13 = 65 marks)

11. (a) Draw the internal RAM organization of 8051 and explain in details. Also, write program to demonstrate stack operation in 8051 microcontroller.

Or

(b) Describe the special function register used for Interrupt configuration. Assume that two switches are connected to pin P3.2, P3.3. Write a program to monitor the switch and perform the following using External Hardware Interrupt.

(i) If SW 1 = 0, Flash Port 0 with (FF to 00).

(ii) If SW 2 = 0, Flash Port 2 with (55 to AA).

12. (a) List the algorithms used for process scheduling. Explain any two algorithms with an example.

Or

(b) Discuss the various states of a task in Real-Time Operating systems.

13. (a) With a neat sketch explain the functional components of typical IoT systems and discuss in detail in the IoT architecture.

Or

(b) Explain the features of Arduino. Discuss types of Arduino boards and sketch structure with pins structures.

14. (a) What is ZigBee? Draw and explain about ZigBee architecture in detail.

Or

(b) Explain Raspberry Pi architecture and discuss how RPi used for IoT application.

15. (a) Draw the GSM architecture with a neat diagram and explore the working of GSM Modules.

Or

(b) What is the role and necessity of IoT in health care and explain with any one Real time example?

PART C — (1 × 15 = 15 marks)

16. (a) Describe the special function register used for Timer operation for the purpose of configuration. Assume an oscillator running at 12 MHz controls an 8051 microcontroller. Write an 8051 ALP to generate 4 kHz square wave on pin3 of port 1 using timer 0 in auto-reload mode.

Or

(b) What is a smart city? What are the characteristics of smart city? Explain briefly about challenges of smart city implementation.