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

Question Paper Code : 40929

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024

Fifth/Sixth Semester

Computer Science and Engineering

CS 3691 – EMBEDDED SYSTEMS AND IoT

(Common to : Computer Science and Engineering (Cyber Security) / Computer and Communication Engineering / 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. State the difference between RET and RET1 instruction in 8051.
2. Draw the format of PSW of 8051 microcontroller.
3. Mention the challenges faced in Sensor interfacing.
4. Mention the role of scheduling in multitasking environment.
5. List the main components of an Arduino board.
6. Differentiate between active sensor and passive sensor.
7. List out the important features of Wi-Fi.
8. Tabulate any two differences between SPI and I2C protocol in Raspberry pi.
9. Recall some real time applications of IoT.
10. Mention the impacts of IoT in smart agriculture application.

PART B — (5 × 13 = 65 marks)

11. (a) Illustrate the 8051 microcontroller architecture with necessary diagrams.

Or

(b) Program the 8051 software Timer / Counter for the time of the day clock. Use three ports to Output Hours, Minutes and Seconds in BCD. Draw the flowchart that depicts the operation.

12. (a) Illustrate the memory organization of 8051 microcontroller.

Or

(b) Verify the schedulability using Rate Monotonic Scheduling (RMS) policy. Compute the schedule for an interval equal to the least-common multiple periods of the process.

Task (T)	Execution Time (C)	Time Period (T)
T1	3	20
T2	2	5
T3	2	10

Compare Rate Monotonic Scheduling (RMS) scheme with Earliest Deadline First (EDF) scheduling and analyze the same in terms of CPU utilization.

13. (a) With a neat sketch, explain the main components of an Arduino Uno in detail and differentiate digitalWrite( ) and analogWrite( ) with suitable example.

Or

(b) With a neat sketch, explain the basic building blocks of the IoT device and essential elements of Smart sensor with suitable example.

14. (a) With a neat sketch, explain the architecture of Bluetooth technology and summarize on the states involved in the connection process.

Or

(b) Show how to interface a light sensor (LDR) with Raspberry pi and develop a python program to switch on an LED based on the LDR reading.

15. (a) Explain the architecture and technology need in building an IoT based health care systems.

Or

(b) Design an IoT strategy for smart city and explain the layered architecture for implementing smart cities.

PART C — (1 × 15 = 15 marks)

16. (a) With neat diagram and programming, explain how a traffic light control will interface with 8051 microcontroller.

Or

(b) Describe the operation of stepper motor. Draw the schematic for interfacing a stepper motor with 8051 microcontroller and write a programming for controlling speed and direction of motor. (5+10)