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Question Paper Code : 91125

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Sixth Semester

Electronics and Communication Engineering

ET 3491 — EMBEDDED SYSTEMS AND IOT DESIGN

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Compare microprocessor and microcontroller.
2. List the various addressing modes of 8051 microcontroller.
3. Define embedded systems.
4. State the use of supervisor mode in embedded systems.
5. Define an operating system and list its primary functions.
6. Name the three states of a process during its execution.
7. Compare IoT Things and M2M machines.
8. What is the role of MQTT in IoT?
9. Write any two important features of Raspberry pi.
10. Mention the scope of developing IoT applications in Public services and smart cities.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Explain the 8051 architecture with neat block diagram.

Or

- (b) Illustrate in detail about timer/counter operations of 8051 microcontroller.

12. (a) Outline the embedded system design process.

Or

- (b) Explain the basic working of NVIC to handle multiple interrupts.

13. (a) Explain how process states are represented and managed by the operating system kernel.

Or

- (b) Apply First Come First Serve and Shortest Remaining Time scheduling algorithm to find the average waiting time and completion time using Gantt chart for the following set of processes (Table 1). Also, compare their performance with respect to average waiting time.

Table 1

Process	Burst Time
P1	4
P2	11
P3	5
P4	3

14. (a) Illustrate an example of IoT service in detail that follows request response model and publish-subscribe communication protocol.

Or

- (b) With the help of neat diagrams, explain the IoT system protocol architecture.

15. (a) Explain in detail the design methodology used to implement IoT devices, explain the level wise design steps with neat diagram.

Or

- (b) Model an automatic refrigerator light system with LED, switch using raspberry pi hardware module and write a python program to support the working of that design.

PART C — (1 × 15 = 15 marks)

16. (a) Explain how IoT technology is impacting the home automation process.

Or

- (b) Explain the system design of smart city for IoT technology.