Reg. No. : E N G G T R E E . C O M

Question Paper Code : 41123

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

Fourth/Sixth Semester

Electronics and Telecommunication Engineering

ET 3491 – EMBEDDED SYSTEMS AND IOT DESIGN

(Common to : Electronics and Communication Engineering)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the criteria for choosing a microcontroller.
2. Draw the general block diagram of the 8051 microcontroller.
3. What is the need for supervisor mode?
4. What is the distinction between specification and architecture?
5. Compute CPU utilization for the given below set of tasks.

Process	Period	Execution time
P1	1.0×10^{-3}	1.0×10^{-4}
P2	1.0×10^{-3}	2.0×10^{-4}
P3	5.0×10^{-3}	3.0×10^{-4}

6. Provide examples of blocking interprocess communication and nonblocking interprocess communication.
7. List out the various applications of IoT.
8. Which limitations make SNMP unsuitable for IoT systems?
9. How is Raspberry Pi different from a desktop computer?
10. What is the use of SPI and 12C interfaces on Raspberry Pi?

PART B — (5 × 13 = 65 marks)

11. (a) Explain about various addressing modes of the 8051 microcontroller.

Or

(b) List out different types of interrupts available in 8051 and write a short note on them.

12. (a) (i) Explain how assembly, linking and loading turn a list of instructions into an image of the program's bit in memory so that it can be executed. (9)

(ii) Draw the flow chart of the compilation process that translates high level language code to assembly code. (4)

Or

(b) (i) List out the data instructions of the ARM processor. (6)

(ii) Discuss how program level performance analysis helps to estimate the run time. (7)

13. (a) (i) Describe how Rate Monotonic Scheduling (RMS) works. (7)

(ii) Compare RMS with the Earliest Deadline First (EDF) scheduling. (6)

Or

(b) Explain how preemption and priorities help Real-Time Operating System (RTOS) to meet timing constraints accurately.

14. (a) (i) Discuss the differences between Machine-to-Machine (M2M) and the Internet of Things (IoT). (8)

(ii) Write a short note on link layer protocols which are relevant in the context of IoT. (5)

Or

(b) Explain the generic approach of IoT device management with NETCONF–YANG.

15. (a) What is an IoT device? Based on the functional attributes, explain the modules of an IoT device.

Or

(b) With a neat diagram, explain various components/Peripherals of a Raspberry Pi board.

PART C — (1 × 15 = 15 marks)

16. (a) Write in detail about the design process involved in block motion estimator to perform block motion estimation within a PC system.

Or

(b) Explain the design of an IoT system for weather monitoring using IoT design methodology with necessary diagrams.