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Question Paper Code : 11381

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Sixth Semester

Electronics and Communication Engineering

ET3491 — EMBEDDED SYSTEMS AND IOT DESIGN

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Draw the format of PSW of 8051.
2. If a 12 MHz crystal is connected with 8051, how much is the time taken for the count in timer 0 to get incremented by one?
3. What is the concept and need for mode switching?
4. Define supervisor mode in embedded systems.
5. What is the role of shared memory in multiprocessors?
6. Define distributed embedded systems.
7. Write any two functions of the IoT communication model.
8. Define BACNet.
9. Mention any two advantages of using Raspberry Pi in IoT applications.
10. Define IoT gateway.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Discuss the types of interrupts and their structure in the 8051 microcontrollers.

Or

- (b) Explain the architecture of 8051 microcontroller with a neat block diagram.

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12. (a) Explain the steps involved in assembly, linking, and loading of embedded programs.

Or

- (b) Discuss the features and architecture of the ARM processor with a suitable illustration.
13. (a) Describe in detail about MPSoCs and shared memory multiprocessors in embedded systems.

Or

- (b) Illustrate and discuss about priority-based scheduling algorithms with examples.
14. (a) Explain the operation, advantages, and real-world applications of the CANBUS protocol in IoT and embedded systems.

Or

- (b) Discuss IoT enabling technologies and their importance in the implementation of IoT systems.
15. (a) Explain the role of IoT in improving urban infrastructure under smart cities.

Or

- (b) Describe the hardware and software components of Raspberry Pi in detail.

PART C — (1 × 15 = 15 marks)

16. (a) Develop a Python-based traffic and pollution monitoring system for a smart city. Also, design the data flow and real-time analytics.

Or

- (b) Design a Python-based smart irrigation system that optimizes water usage based on soil moisture, weather forecast and crop type and also explain the system logic.