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Question Paper Code : 50984

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

Fifth/Sixth Semester

Electrical and Electronics Engineering

EE 3016 – EMBEDDED SYSTEM DESIGN

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define embedded system. Give two factors specific to embedded processors that differentiates it from a general processor.

2. List out the important challenges faced in designing an embedded system.

3. Mention the significant differences between timers and counters.

4. Compare RS232, RS485, CAN Bus, SPI, and I2C in terms of speed and reliability.

5. How does a system handle multiple interrupts occurring simultaneously?

6. What factors influence interrupt latency, and why is it crucial in real-time systems?

7. What is the fundamental difference between a task, process, and thread in the context of real-time operating systems?

8. What are the potential drawbacks of using shared memory for task communication in RTOS?

9. List out the steps involved in planning and analysis stage of an embedded product development.

10. What factors influence the selection of embedded platforms during development?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss about the factors to be considered for selection of processor in embedded system.

Or

(b) Mention the various applications of an embedded system and explain in detail.

12. (a) Explain functionalities of RS232 and RS485 standard serial interface with neat diagram.

Or

(b) Write short notes on watch dog timer, CAN bus, and inter-integrated Circuits (I^2C).

13. (a) Explain device driver and interrupt service mechanism in an embedded system with suitable diagrams.

Or

(b) Explain in detail about interrupt latency and their solutions.

14. (a) Explain in detail about the following function types;

(i) Semaphore function (7)

(ii) Socket function (6)

Or

(b) Explain in detail about the features and scheduling algorithm used in RTOS.

15. (a) Explain briefly about various design process in automatic chocolate vending machine.

Or

(b) Give the brief overview of different steps involved in embedded products development life cycle.

PART C — (1 × 15 = 15 marks)

16. (a) With neat diagram explain USB protocol and state how it can be considered for a multiple device serial bus communication.

Or

(b) With help of neat block diagram explain in detail about the concept of smart agricultural field monitoring system.

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