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Question Paper Code : 70566

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Sixth/Seventh/Eighth Semester

Electrical and Electronics Engineering

EE 8691 – EMBEDDED SYSTEMS

(Common to : Electronics and Instrumentation Engineering/
Instrumentation and Control Engineering)

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Distinguish between an Embedded System and a Personal Computer based system.

2.   What is the role of a real time clock in an Embedded System?

3.   List the control signals used in RS232 standard.

4.   Distinguish between I²C and CAN bus protocol.

5.   Draw the data flow graph to represent the equations x = a + b; y = x - c ;

6.   List the advantages of object oriented model.

7.   State the differences between binary semaphore and counting semaphore.

8.   What are the causes for deadlock in embedded system design?

9.   Does a washing machine require an RTOS? Justify your answer.

10. Mention the factors to be considered while selecting a processor for automotive application.

PART B — (5 × 13 = 65 marks)

11. (a) (i) State the difference between RISC and CISC processors. (7)

    (ii) What is the use of In circuit emulator? (6)

Or

    (b) (i) Discuss the difference between microprocessor and a microcontroller. (7)

    (ii) Describe the purpose of a watch dog timer in a processor. (6)

12. (a) (i) Explain the major control signals required for I²C communication. (7)

    (ii) What is the need for device drivers? (6)

Or

    (b) (i) Why is CAN bus protocol most preferred in automotive system design? (7)

    (ii) Discuss the need of a real time clock in a processor. (6)

13. (a) (i) Draw the relationship between various phases of Embedded product development life cycle model. (7)

    (ii) List the various type of system testing carried out during testing phase. (6)

Or

    (b) (i) Discuss the spiral approach for design of an embedded system. (7)

    (ii) Distinguish between preliminary design and detailed design during the design of embedded system. (6)

14. (a) (i) In RTOS environment, what is the meaning of shared data problem. (7)

    (ii) With suitable example, explain how the priority of a task is changed. (6)

Or

    (b) (i) Explain briefly how is inter process communication carried out in RTOS. (7)

    (ii) Describe how priority inversion problem is handled. (6)

15. (a) Describe the working of a smart card system. (13)

Or

    (b) Elaborate on the steps involved in the design of a digital camera. (13)

2 70566

PART C — (1 × 15 = 15 marks)

16. (a) Design an automatic tea/coffee vending machine based on FSM model for the following requirement. The tea/coffee vending machine is initiated by user inserting 5 rupee coin. After inserting the coin, the user can select 'Coffee' or 'Tea' or press 'Cancel' to cancel the order and take back the coin.

Or

(b) Develop a sequential program model for a seat belt warning system with the following requirements. The system should check the Ignition state of the vehicle, wait for 10 seconds and then check the seat belt state. System should start and stop the alarm upon failure to check the seat belt.

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70566