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Question Paper Code : 10586

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

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. What are the advantages and disadvantages of using DMA?

2. Draw the circuit diagram of typical reset circuitry used in microcontrollers.

3. Compare RS232, RS422 and R5485 protocols.

4. Name the parts of a CAN data frame

5. List the six steps to a successful design.

6. What are the advantages of co-design methodology?

7. State the different states of a process.

8. What are the factors to be considered for selection of a proper scheduling algorithm?

9. List the communication protocol used in automotive embedded systems.

10. What are the steps to be followed while designing an embedded system for real time application?

PART B — ($5 \times 13 = 65$ marks)

11. (a) Explain the functions of the following structural units of Embedded system.

(i) Watch dog timer (4)

(ii) Timer and counter unit (3)

(iii) Brown out reset circuitry (3)

(iv) Real time clock. (3)

Or

(b) What are the factors to be considered for selection of memory device? Explain the various memory management methods.

12. (a) Explain the working of I^2C protocol and CAN protocol. State the difference between the two.

Or

(b) What are device drivers? Discuss the need for device drivers.

13. (a) Explain the iterative model for in Embedded product development cycle.

Or

(b) Describe the steps involved in hardware software co-design.

14. (a) Distinguish between periodic, aperiodic and sporadic tasks.

Or

(b) Explain the rate monotonic scheduling with an example.

15. (a) Describe the complete design of digital camera.

Or

(b) Explain the design of smart card system.

PART C — (1 × 15 = 15 marks)

16. (a) Consider three periodic tasks with priorities, periods and execution time as given in Table. Draw the schedule diagram corresponding to how these tasks will be scheduled, assuming that all the jobs have the same release time (i.e. they arrive in the ready queue at the same time) (i) with preemption (ii) without preemption

Tasks	Priority	Period	CPU burst
T1	1	7	2
T2	2	17	4
T3	3	24	8

Or

(b) Design and implement a digital clock as per the following requirement. Use a 16 character 2-line display for displaying the current time. Display the time in DAY HH:MM:SS format in the first line. Display the message "Have a nice day" on the second line.