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**J 3324**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2009.

Sixth Semester

Mechatronics Engineering

MH 1001 — EMBEDDED SYSTEM AND DESIGN

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What determines the maximum possible physical memory addressable by a microprocessor?
2. Define the terms 'interrupt' and 'interrupt latency'.
3. List the addressing modes supported by a PIC microcontroller.
4. Which on-chip resources are available in a PIC microcontroller?
5. Distinguish between polled and vectored interrupts.
6. List the specifications of RS232 serial I/O interface.
7. What are the shortcomings of the round-robin architecture?
8. List the essential tools that would facilitate embedded system software development.
9. What are the characteristics of a Real Time Operating System?
10. What rules must 'interrupt routines' in RTOS environments follow?

PART B — (5 × 16 = 80 marks)

11. (a) With a block diagram, discuss the hardware components required to build a typical embedded application.

Or

- (b) Discuss a solution to a shared data problem and interrupt latency with examples.
12. (a) Discuss the typical architecture of a PIC microcontroller highlighting the purpose of various on-chip resources available in it.

Or

- (b) Explain how data is handled through serial communication using the UART in a PIC microcontroller highlighting the initialization and programming features involved.
13. (a) Discuss the addressing modes supported by the Motorola MC68H11 microcontroller with suitable examples.

Or

- (b) Distinguish between 'interrupts' and 'exceptions'. Discuss the different methods adopted for handling interrupts in an embedded microcomputer system.
14. (a) Explain how round robin architecture with interrupt satisfies urgent needs of an hardware taking communication bridge as an example.

Or

- (b) Discuss the use of various development tools in the hardware and software development of an embedded system.
15. (a) (i) Explain the precautions you need to take when using semaphores. (8)
- (ii) Discuss the implementation of memory management in a multitasking system. (8)

Or

- (b) Design an elevator controller using the RTOS concepts. Specify the assumptions made.