Reg. No. : | | | | | | | | | | | |

Q 2335

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Sixth Semester

Information Technology

IF 363 — EMBEDDED ARCHITECTURE

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Why is the data bus in most microprocessors bidirectional while the address bus is unidirectional?

2. How are interrupts different from polling?

3. Why power consumption is a serious issue in embedded systems?

4. What is the significance of Timer 1 and Timer 2 in PIC microcontroller?

5. What is an interrupt vector table and what is its relevance in embedded systems?

6. List the major differences between RS 232 and RS 485.

7. Why it is necessary to understand the CPU architecture for the development of embedded software?

8. What is a simulator and why it is required?

9. List the guidelines to be followed while writing an ISR.

10. What are events and how they are different from message queues?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the typical challenges of programming for embedded systems? (8)

(ii) What is timing diagram? Give the timing diagram for NOR gate and explain. (8)

Or

(b) (i) Discuss about the shared data problems and the mechanism to solve the problems in detail. (10)

(ii) What is an interrupt controller? Design an interrupt controller to connect 16 devices to a microprocessor with 4 interrupt pins. (6)

12. (a) (i) Describe input port expansion using serial peripheral interface with neat diagram. (8)

(ii) Explain the applications of pulse width modulation outputs in detail. (8)

Or

(b) (i) Explain output port expansion using serial peripheral interface with schematic diagram. (10)

(ii) Describe the special features of PIC in detail. (6)

13. (a) (i) An 8-bit microprocessor has a 16-bit address bus. The first 15 lines of the address are used to select a bank of 32 K bytes of memory. The high-order bit of the address is used to select a register which receives the contents of the data bus. Explain how this configuration can be used to extend the memory capacity of the system to 8 banks of 32 K bytes each, for a total of 256 K bytes of memory. (10)

(ii) With suitable diagram explain the functions of a typical parallel I/O interface. (6)

Or

(b) (i) Describe the quantitative parameters used to evaluate the performance of an I/O interface. Also explain any two approaches to high speed interfaces. (8)

(ii) What does meant by addressing mode? Describe the addressing modes of MC 68 H 11. (8)

14. (a) (i) Briefly explain various debugging strategies used in an embedded systems. (8)

(ii) Describe the scheduling architecture and the algorithms used in embedded software development. (8)

Or

(b) (i) What is recursion? What is its relevance in embedded systems? (6)

(ii) Describe the essential features of an IDE for the development of software for embedded systems. (10)

15. (a) (i) What is a task and how is it started, scheduled and deleted? (8)

(ii) Describe various intertask communication mechanism in real time systems. (8)

Or

(b) (i) Why it is necessary to return the execution control after executing an ISR to the task that was executed when the ISR was raised? (8)

(ii) Describe the design issues of an RTOS in detail. (8)