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4.1.16 AN

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Question Paper Code : 21765

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Sixth Semester

Computer Science and Engineering

IT 2354/ IT 64/ 10144 IT 605/ 10144 CSE 26 — EMBEDDED SYSTEMS

(Common to Information Technology)

(Regulations 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish an embedded system and a general purpose system.
2. List the types of 8051 instructions based on the operations and give one example to each.
3. Write the instruction to configure timer/counter 1 as a counter in mode 2 to count external pulses and indicate in which pin external pulses must be given.
4. Differentiate SRAM and DRAM memory.
5. Define pre-emptive multitasking with an example.
6. Define re-entrant program.
7. List the advantages of using Embedded C over assembly language.
8. Classify multi-state systems and give one example of each type.
9. List four design issues in embedded system design process.
10. What is the need for a design methodology? Name two methodologies to design an embedded system.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the data path of ARM processor with a neat diagram. (6)
(ii) Explain the embedded system design process of a Digital Camera. (10)

Or

- (b) (i) Draw the architecture diagram of 8051 microcontroller and explain each module. (8)
(ii) Write an ALP to generate a square wave of 1KHz with a duty cycle of 40%. Use timer to generate delay. Crystal frequency used is 11.0592 MHz. (8)
12. (a) (i) Interface a 32K × 8 Data RAM chip and a 32K × 8 program ROM chip with 8051 microcontroller. Use 2×4 decoder for chip select logic. Also write address space for RAM and ROM ICs. (10)
(ii) Write an ALP to delete the contents of first 50 memory locations in the data RAM as per above connection. (6)

Or

- (b) (i) Explain vectored interrupts of 8051. Also explain how they can be enabled or disabled using IE register. (6)
(ii) Write an 8051 assembly language program using interrupts to do the following (10)
- (1) Open the emergency exit by sending a control signal through P1.0 when a switch connected to P3.3 is pressed (highest priority job);
 - (2) Generate a control signal through P1.1 to switch ON and OFF the LEDs, connected around a decorative art, for every second;
 - (3) Read P1.2 and write the same into P1.3 continuously.

13. (a) Explain scheduling algorithms for real time embedded systems with examples. (16)

Or

- (b) Classify Inter Process Communication styles. Explain in detail about each type. (16)

14. (a) (i) How register allocation is done in 8051 for a program written in Embedded C? (5)
- (ii) Write an Embedded C program to monitor the status of a switch and display the status on an LED. (6)
- (iii) Explain how real time constraints are handled in an embedded system. (5)

Or

- (b) (i) Describe in detail about any three design methodologies. (8)
- (ii) Discuss the need of a debugger and an emulator in embedded software development. (8)
15. (a) Design an intruder detection embedded system and explain. (16)

Or

- (b) Design an Elevator controller using an embedded system. (16)
