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Question Paper Code : 81426

M.E. DEGREE EXAMINATION, JUNE 2012.

First Semester

Embedded system Technologies

ET 9212/234102/ET 912/UET 9112 — MICROCONTROLLER BASED SYSTEM DESIGN

(Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How is the program memory organized in 8051?

2. Write the vector address of different interrupts in 8051.

3. Write the operation carried when the instruction MOVC, A @ A + PC is executed by 8051.

4. What is meant by real time operating system?

5. How is the internal RAM in PIC microcontroller accessed by indirect addressing?

6. What are the features of MP-LAB integrated development environment?

7. What are the different capture modes available in the capture module of PIC microcontroller?

8. Write the function of the bits EEPGD and WRERR bits in the EECONI register in PIC microcontroller.

9. How can the LCD be tested whether it is ready or not to receive a command or data?

10. What is a data acquisition system?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the data memory organisation in 8051 in detail. (8)

(ii) Interface an 8-bit DIP switch with 8051 such that the address 44 H is assigned to it. (8)

Or

(b) (i) Explain the operation carried out when the following instructions are executed by 8051: (8)

(1) MOV 33H, RO

(2) MOV @ R1, # 80H

(3) MOV X A, @ R1

(4) DJNZ R6, L1 where L1, is a label.

(ii) With neat diagram, describe the structure of parallel port PO in 8051 in detail. (8)

12. (a) (i) Write 8051 assembly language program to arrange ten 8-bit data in the internal RAM stored as an array from the address 50H in descending order. (8)

(ii) Write the macros used to carry out the interface operations of RTOS lite along with its explanation. (8)

Or

(b) (i) Write 8051 assembly language program to generate a square wave of 400 Hz in port pin P1.4 by using Timer 1 overflow interrupt. (8)

(ii) Draw the task diagram in LCD digital clock/thermometer while using Full RTOS and explain it. (8)

13. (a) (i) Explain the memory organisation in PIC 16 F 877 with necessary diagrams (8)

(ii) Describe the operation carried out when the following instructions are executed by PIC 16 F 877.

(1) bcf STATUS, 5

(2) movlw F5H

(3) swapf FSR, W

(4) movwf PORT B (8)

Or

(b) (i) Write PIC 16F877 assembly language program to find the largest 8-bit data in an array which is stored in the data memory from the address 20H and store the result at the address 50H. The array has twenty data. (8)

(ii) Explain the hardware features of timer O in PIC 16 F 877 with neat diagram. (8)

14. (a) Explain the interrupt structure of PIC 16 F 877 indicating all the registers associated with the interrupts. (16)

Or

(b) Interface a temperature sensor that gives O to 5V output over its measurement range with PIC 16 F 877 and write the program to obtain the digital data corresponding to the measured temperature and store it in any two internal RAM locations of PIC 16 F 877. (16)

15. (a) Interface a 4 × 4 hexadecimal keyboard with 8051 and write assembly language program to find the key number that is pressed in the keyboard and send the ASCII code of that key number to parallel port 2 (p2) of 8051. The above process has to be done repeatedly. (16)

Or

(b) With necessary diagrams, explain the generation of gating signals for a single phase half controlled rectifier used to control speed of a dc motor, using any one microcontroller. (16)
