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Question Paper Code: R4425

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

Fourth Semester

Computer Science and Engineering

R21UEC425- MICROPROCESSORS AND MICROCONTROLLERS

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. How much memory a 20 bit address bus can access? CO1-U
(a) 1KB (b) 1MB (c) 2MB (d) 256KB
2. How much time period is necessary for the slave to receive the interrupt and transfer the data? CO1-U
(a) 4 clock time period (b) 8 clock time period
(c) 16 clock time period (d) 64 clock timeperiod
3. Which pin of port3 has an alternative function as write control Signal for external data memory? CO1-U
(a) P3.8 (b) P3.3 (c) P3.6 (d) P3.1
4. SETB P0.6 will CO1-U
(a) Makes the port0,sixth pin to 1 (b) Makes the port0,sixth pin to 0
(c) will do nothing (d) none of the above
5. How many RPO status bits are required for the selection of two register banks? CO1-U
(a) 1 (b) 2 (c) 8 (d)16

PART – B (5 x 3= 15 Marks)

6. If AX =1234H, what will be the content of AX after execution of RCL AX,02 instruction? CO2-App

7. Write a BSR control word subroutine to set bits PC7 and PC3 and reset them after 10 ms. The Control register address is 83H. Assume that the delay subroutine is available CO2-App
8. Distinguish polling and interrupt mechanism. CO1-U
9. Why Vref is set of ADC0848 to 2.56 V if analog input is connected to the LM35? CO1-U
10. How do you make a port as I/P & O/P port in aurdino micro controller? CO1-U

PART – C (5 x 16= 80 Marks)

11. (a) Three 16-bit numbers N1, N2 and N3 are stored in memory. These numbers are to be changed in the following manner a) Upper bytes of N1 and N2 are exchanged b) Lower bytes of N2 and N3 are exchanged. Write separate programs using (i) register addressing. (ii) indirect addressing and (iii) XCHG instructions. CO2-App (16)

Or

- (b) Calculate the effective address & physical address of the following instructions. (a) IMUL AX, [BP+BX-8D] (b) SBB AL, ES:[SI+5D] (c) PUSH AX (d) AND AH, [SI + 42D] (e) CMPSB (f) CMP DX, [SI] Assume CS = 5000H, DS = 8000H, SS = A000H, ES = B000H, SI = 2000H, DI = 6000H, BP = 1002H, SP = 0002H, AX = 0000H, BX = 5200H, CX = 2000H CO2-App (16)

12. (a) Design an interface between 8086 CPU and two chips of 16K X 8 EPROM and 32K X 8 RAM. Select the starting address of EPROM suitably. The RAM address must start at 00000H CO2-App (16)

Or

- (b) Design a Programmable timer using 8254 and 8086. Interface 8254 at an address 0040H for counter0 and write the following 9 ALPs. The 8086 and 8254 run at 6 MHz and 1.5 MHz respectively CO2-App (16)
- i) To generate a square wave of period 1ms
- ii) To interrupt the processor after 10 ms.

13. (a) Outline the internal architecture of 8051 microcontroller with neat diagram. CO1-U (16)

Or

- (b) Explain the TMOD function register and its timer modes of operations. CO1-U (16)

14. (a) Write a program to generate a sine wave using DAC chip CO2-App (16)
connected to the 8051 controller.

Or

- (b) Assume that the 8255 is interfaced to the 8051 at the addresses CO2-App (16)
20H-23H. Write a program to read the content of Port A and write
it in other ports.

15. (a) Explain in detail about the function of various port pins of aurdino CO1-U (16)
microcontroller.

Or

- (b) Illustrate the function of aurdino microcontroller instructions for CO1-U (16)
performing arithmetic and logical operations with suitable example.

