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Fourth Semester B.E. Degree Examination, Jan./Feb. 2023 Microcontroller

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Differentiate between microcontrollers and microprocessor (any five). (05 Marks)
- b. Explain the following pins of 8051 microcontroller i) EA ii) ALE iii) PSEN
iv) XTAL1 and XTAL2 v) RD. (05 Marks)
- c. With a neat block diagram, explain the architecture of 8051 microcontroller briefly. (10 Marks)

OR

- 2 a. Explain in brief with respect to 8051 microcontroller:
i) Program status word ii) Dual function of port 3 pins. (04 Marks)
- b. Show neat schematic to interface 8KBROM (External) and 8KB external Data RAM to 8051 microcontroller. (06 Marks)
- c. Write circuit diagram of port 1, Explain input, output operations in 8051 using port 1. (10 Marks)

Module-2

- 3 a. Define addressing mode, explain the addressing modes of 8051 with examples (any 4). (10 Marks)
- b. Explain the following instructions of 8051 with an example for each instruction:
i) SUBBA, addr ii) Movc A, @ A + DPTR iii) PUSH addr iv) SETB psw . 4
v) RL A (10 Marks)

OR

- 4 a. Write an ALP in 8051 to exchange the contents of registers R7 and R6 in register Bank 0 in five different ways. (10 Marks)
- b. Explain the different types of conditional and unconditional jump instructions of 8051. Specify the different range associated with jump instruction. (10 Marks)

Module-3

- 5 a. Assume that the RAM locations 40h-44h have the following values. Write an ALP to find the sum of the values. Store the low byte of the result in A register and high byte of the result in R7 register, (involving loops in program)
40h – (70)
41h = (EBG)
42h = (C5h)
43h = (5Bh)
44h = (30h) (10 Marks)
- b. Write an ALP in 8051 to move a block of data stored in external memory location 9000h to a location starting from fooh. Block length N = 5. (10 Marks)

OR

- 6 a. Using registers write a subroutine to get
- A delay of 5 msec, assume the crystal oscillator frequency is 22MHz show delay calculations.
 - A delay of 200msec, assume the crystal frequency is 11.0592MHz show the delay calculations. (10 Marks)
- b. Design a circuit to interface a simple LED and a switch to 8051 μ c. Write an ALP in 8051 to turn LED ON/OFF, if the content of the internal bit addressable memory location 20h content is 01 or ooh respectively. LED is connected to pin p2.0, switch (sw) connected to p1.0. (05 Marks)
- c. Briefly explain about stack and stack operations. (05 Marks)

Module-4

- 7 a. With regard to timers of 8051
- Explain TMOD and TCON registers with its bit pattern. (10 Marks)
 - Indicate how to start/stop timer if GATE control is also used. (05 Marks)
- b. Explain mode 2 programming with neat sketch and specify the program steps. (05 Marks)
- c. Write an assembly language program in 8051 to generate a pulse using mode-1 on a port pin p1.4 with delay of pulse as 1ms, crystal frequency of 11.0592 MHz. Show delay calculation. (05 Marks)

OR

- 8 a. List the advantages of serial communication over parallel communication. (06 Marks)
- b. Explain briefly the asynchronous serial communication format with an example. (04 Marks)
- c. Write an 8051 ALP and C program for the 8051 to transfer the letter 'A' serially at 4800 baud rate continuously. Use 8 bit data and 1 stop bit. (10 Marks)

Module-5

- 9 a. With regard to the interrupt of 8051:
- Give the vector addresses of the interrupts.
 - Briefly explain the procedure of enabling/disabling the entire interrupt system and enabling/disabling of individual interrupts.
 - What are the steps micro controller to perform up on activation of an interrupt. (10 Marks)
- b. Show the interfacing of a stepper motor to 8051. A switch is connected to (SW) pin P3.2. Write an assembly language program to monitor the status of SW and perform the following:
- If SW = 0 the stepper motor moves clockwise
 - If SW = 1 the stepper motor moves anti clockwise. (10 Marks)

OR

- 10 a. Write an ALP to generate a square wave of 5kHz on pin P1.2. Using an interrupt generated from timer 0 of 8051 μ c, crystal frequency 22MHz. (08 Marks)
- b. Interface an LCD display to 8051 and write an ALP to display the characters 'A' 'B' 'C'. (12 Marks)
