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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. Define Microcontroller. With a neat block diagram, explain the architecture of 8051 μ c. (10 Marks)
- b. Give difference between:
 - i) Harvard and Von-neuman memory architecture. (10 Marks)
 - ii) RISC and CISC. (10 Marks)

OR

- 2 a. With a neat diagram, explain the I/O operation of PORT 1. (06 Marks)
- b. Explain PSW bit pattern in detail. (06 Marks)
- c. With a neat schematic show the hardware interfacing between 8051 and 8K ROM (external). (08 Marks)

Module-2

- 3 a. Define Addressing mode. Along with an example for each explain the different addressing modes of 8051. (10 Marks)
- b. Explain the following function with an example for each:
 - i) DAA ii) PUSH iii) POP iv) XCHD v) MOVC. (10 Marks)

OR

- 4 a. Register R₂ is having an hexadecimal number x₁x₂h. Write an ALP to store 0x₁h in R₃ and 0x₂h in R₄ register respectively. (06 Marks)
- b. Explain subroutine along with the significance of stack memory when a CALL is made. (06 Marks)
- c. Explain different byte level and bit level jump and call instructions of 8051. (08 Marks)

Module-3

- 5 a. Explain the different 8051 C data types with an example. (06 Marks)
- b. Write a C program to toggle all the bit of p0 and p1 continuously with 1ms delay. (06 Marks)
- c. Write a 8051 C program to monitor the door sensor connected to p1.1 pin. When the door opens sound the buzzer connected to p1.7. The buzzer is sounded by sending a square wave of few hundred HZ. (08 Marks)

OR

- 6 a. Explain TMOD and TCON SFR bit patterns. (10 Marks)
- b. Write an ALP and C program to generate a square wave with ON time of 4ms and OFF time of 3ms on p3.4, with xtal = 22MHz, Timer 0, Mode 0. (10 Marks)

Module-4

- 7 a. Explain SCON bit pattern. (05 Marks)
b. Explain the significance of TI and RI in serial communication. (08 Marks)
c. Write a C-program to serially transfer the message "HELLO" continuously at 9600 baud rate, 8 bit data and 1 stop bit. (07 Marks)

OR

- 8 a. Explain IE and IP SFR bit patterns. (10 Marks)
b. Write a C program to generate two square waves of 5kHz and 25kHz at pin p1.3 and p2.3 respectively, with crystal frequency of 22MHz and in interrupt mode. (10 Marks)

Module-5

- 9 a. With a neat interfacing diagram write a 8051 C program to display "NATION" on LCD. Mention the pin details of LCD. (10 Marks)
b. Write a C program to generate
i) Sine waveform
ii) Step wave for step size $N = 5$. (10 Marks)

OR

- 10 a. Write an 8051 C program to rotate stepper motor in clock wise and anticlockwise direction along with interfacing diagram. (10 Marks)
b. Write an 8051 ALP to detect the key pressed connected at pin p3.2 and send the data '0' to the serial port 1. (10 Marks)
