CBCS SCHEME

USN | | | | | | | | | | |

18EC46

Fourth Semester B.E. Degree Examination, June/July 2025
Microcontrollers

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Write the block diagram of 8051 and explain its main features. **(08 Marks)**
b. Explain the internal RAM and ROM organization. **(06 Marks)**
c. What is embedded system? Write its characteristics. **(06 Marks)**

OR

2 a. With necessary diagram, explain :
i) Flags and program status word
ii) Stack operation. **(10 Marks)**
b. Write the interfacing diagram of 16 K bytes of RAM and 32 K bytes of EPROM to 8051 microcontroller and explain. **(10 Marks)**

Module-2

3 a. Explain the different rotation instructions present in 8051 microcontroller with an example. Also explain the working SWAP instruction. **(08 Marks)**
b. List the conditional and unconditional jump instruction present in 8051 and explain its working. **(06 Marks)**
c. Explain the working of following instruction with an example :
i) MOVX A, @dpts
ii) RETi
iii) RL A
iv) RRC A
v) DAA
vi) PUSH 02 **(06 Marks)**

OR

4 a. Define assembler directives. With example explain all the assembler directives supported by 8051 microcontroller. **(08 Marks)**
b. With a neat diagram, explain the range associated with JUMP instructions. **(06 Marks)**
c. Write an ALP to find the average of five 8 bit numbers. Store the result in 55H. **(06 Marks)**

Module-3

5 a. Name the external hardware interrupts present in 8051 and how the activation of them will be done. **(06 Marks)**
b. Write an ALP to find the number of 1's and 0's present in the external RAM 8000H. **(08 Marks)**
c. Explain why pull up registers are connected to port '0'. **(06 Marks)**

OR

6 a. Write a note on subroutine using CALL and RET instructions. **(08 Marks)**
b. Write an ALP to find the factorial of given number and store the results in register R2. **(06 Marks)**
c. Write an ALP to blink all the LED's connected to port P1 at 0.5 second. Assume crystal frequency as 22 MHz. show all the calculations. **(06 Marks)**

Module-4

7 a. Explain :
i) Half and full duplex transmission
ii) Serial control register **(08 Marks)**
b. Explain with diagram different steps to program timer 0 in mode 1. **(06 Marks)**
c. Assume XTAL = 22 MHz. Use timer 1 in mode 1. Write an ALP to generate a pulse train of 2 seconds period on P2.4. **(06 Marks)**

OR

8 a. Explain the bit pattern of SCON register in 8051 microcontroller. **(06 Marks)**
b. Write a 8051 'C' program to transmit the message HELLO using serial communication port of 8051. Use band rate 4800. **(06 Marks)**
c. Explain the importance of TI flag and RI flag. **(08 Marks)**

Module-5

9 a. Explain different types of interrupts in 8051 microcontroller. **(08 Marks)**
b. Write an ALP to generate a square wave of frequency 10 Hz on P1.2 using 8 bit auto reload timer and also to read the data from P2 and send it through P3 continually. Use timer interrupt. **(06 Marks)**
c. Write the interrupt priority upon reset in 8051. Also explain how the priority of interrupts can be set using IP register. **(06 Marks)**

OR

10 a. Explain DAC interface with diagram and also write a program to generator stair case wave form. **(10 Marks)**
b. Explain the pins of ADC – 0804 and give its pin diagram write an ALP to rotate stepper motor in clockwise and anticlockwise direction for 5 rotations. **(10 Marks)**

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