

# CBCS SCHEME

18EE52



## Fifth 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. Distinguish the different types of architecture of microcontroller in regard to construction and instructions with diagrams. (06 Marks)
- b. Explain the PSW register with bit pattern. Discuss the function of each flag in detail. (06 Marks)
- c. What is stack? Show the position of stack pointer and contents in register after the execution of the following instructions:  
MOV R<sub>6</sub>, # 25H  
MOV R<sub>1</sub>, # 12H  
PUSH 06  
PUSH 01  
POP 03 (08 Marks)

OR

- 2 a. Describe the functions of various pins of 8051 microcontroller with pin diagram. (06 Marks)
- b. Explain the architecture and structure of internal RAM of 8051. (08 Marks)
- c. State the addressing modes and explain with examples each of the following instructions:  
i) MOV A, #30H      ii) MOVC A, @A+PC      iii) DA A. (06 Marks)

### Module-2

- 3 a. Explain the assembler directives in 8051 with examples. (06 Marks)
- b. Explain the working of the instruction SUBB when borrow = 0 and borrow = 1. (06 Marks)
- c. A student has to take 6 courses in a semester. The marks of the student out of 25 are stored in RAM locations 50H onwards. Write a program to find the average marks and save it in register R<sub>6</sub>, in assembly language. (08 Marks)

OR

- 4 a. Explain the different types of conditional and unconditional jump instruction of 8051. Specify the different range associated with jump instruction. (08 Marks)
- b. Write an ALP to count the number of ones in a given data. (06 Marks)
- c. Explain the following instruction of 8051 with example:  
i) XCHD, @R1  
ii) SWAPA  
iii) MOVX A, @DPTR. (06 Marks)

### Module-3

- 5 a. Explain C data types for 8051 with their data size in bits and data range. (06 Marks)
- b. Write 8051 C program to send values - 4 to +4 to port P<sub>1</sub>. (06 Marks)
- c. Explain TMOD and TCON with its bit pattern. (08 Marks)

OR

- 6 a. Explain Mode 2 programming of 8051 timer. Describe the different steps to program in Mode 2. (06 Marks)
- b. Write an ALP program to create a time delay of 20msec. Assume timer 1, mode 1 and XTAL frequency = 12MHz. (06 Marks)
- c. Write an 8051C program to get a byte of data from P<sub>1</sub> wait 1/2 second, and then send it to P<sub>2</sub>. (08 Marks)

Module-4

- 7 a. What is an interrupt? List the various interrupts of 8051 with their corresponding vector address. (06 Marks)
- b. Write a ALP to retrieve the data serially and put them in P<sub>1</sub>. Set the baud rate at 4800, 8 bit data and one stop bit. (06 Marks)
- c. Write 8051 C program at 9600 baud, 8 bit data, 1 stop bit. (08 Marks)

OR

- 8 a. Describe the bit status of SCON register. (06 Marks)
- b. Write an ALP that continuously gets 8 bit data from P<sub>0</sub> and sends it to P<sub>1</sub> while simultaneously creating a square wave of 200µs on P2.1. Use timer 0, XTAL = 11.0592MHz. (06 Marks)
- c. Assume INTI pin is connected to a switch that is normally high. Whenever it goes low, it should turn on an LED, the LED is connected to P1.3 and is normally off. When it is turned on it should stay on for a fraction of a second. As long as the switch is pressed low, LED should stay on. (08 Marks)

Module-5

- 9 a. Explain the internal architecture of ADC 0804 and its timing diagram to convert analog data to digital form. (08 Marks)
- b. Write an ALP to rotate stepper motor continuously. (06 Marks)
- c. Explain the block diagram of 8255 chip. (06 Marks)

OR

- 10 a. Write a C program to generate a sine wave DAC. (08 Marks)
- b. Show interfacing of 8051 microcontroller with DC motor through opto isolator. (06 Marks)
- c. Explain various modes of 8255 using control word. (06 Marks)

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