CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐ **18EE52**

Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024

Microcontroller

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Compare and contrast microprocessor and microcontrollers. **(06 Marks)**

b. Explain the various internal blocks of a 8051 CPU with necessary block diagram. **(08 Marks)**

c. Discuss the internal memory organization of 8051 microcontroller. **(06 Marks)**

OR

2 a. Explain the bit pattern of program status word. **(06 Marks)**

b. Identify the addressing modes of the following instructions:

i) MOVC A, @A + DPTR
ii) MOV DPTR, #5500H
iii) MOV A, RO
iv) MOV 50H, RO
v) MOV A, @R_1
vi) MOVX A, @DPTR **(06 Marks)**

c. Show how to interface external ROM and RAM to 8051. Explain how 8051 access them. **(08 Marks)**

Module-2

3 a. Write an ALP to find the square root of a given number. **(06 Marks)**

b. With a neat diagram, explain the range of JUMP and CALL instructions. **(08 Marks)**

c. What are assembler directives? Explain any four of them with an example. **(06 Marks)**

OR

4 a. Write an ALP to complement the content of accumulator 700 times. **(06 Marks)**

b. Explain the steps involved to assemble and run an 8051 program. **(08 Marks)**

c. Explain the following instructions with an example: i) DIV AB ii) SWAP A iii) DA A. **(06 Marks)**

Module-3

5 a. Explain with an example the different data types supported by 8051 C microcontroller. **(08 Marks)**

b. Write an 8051 C program to turn bit P1.5 ON and OFF 5000 times. **(04 Marks)**

c. Explain Mode-1 programming of 8051 timer. Describe the different steps to program in Mode-1. **(08 Marks)**

OR

6 a. Write an 8051 C program to convert packed BCD 28H to ASCII and display bytes on P_1 and P_2 port. **(06 Marks)**

b. Explain TMOD and TCON register with its bit pattern. **(08 Marks)**

c. Generate a square wave of frequency 2kHz using timer in Mode-1 on pin P1.2. Show necessary calculations to find the value of count to be loaded into TH1 and TL1 registers. Assume XTAL frequency = 11.0592MHz. Use assembly program. **(06 Marks)**

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-4

7 a. Explain interrupt structure of 8051 and facility available for programming of interrupts. **(06 Marks)**

b. Write an ALP to transfer the message 'GOOD LUCK' serially at 9600 band rate, 8-bit date, 1 stop bit. **(08 Marks)**

c. Write a C program using interrupts to do the following:
   i) Generate a 5000Hz frequency on P2.1 using timer 0 with Mode-2 operation.
   ii) The pulse train is connected to P3.5. Use timer-1 as event counter to count up to a 1Hz pulse and display it on P0. Assume XTAL = 12MHz. **(06 Marks)**

OR

8 a. Describe bit status of SCON register. **(06 Marks)**

b. Write 8051ALP in which 8051 reads date from P1 and writes it to P2 continuously while giving a copy of it to serial COM port to be transferred serially. Assume band rate = 9600. XTAL frequency = 11.0952 MHz. Use timer – 2 in Mode 2. **(08 Marks)**

c. Explain bit pattern of IP register. **(06 Marks)**

Module-5

9 a. A switch is connected to pin P2.7. Write a 'C' program to monitor the status of 'SW' and perform the following:
   i) If SW = 0 : stepper motor moves clockwise
   ii) If SW = 1 : stepper motor moves anticlockwise. **(08 Marks)**

b. Explain the steps to interface ADC 0808 to 8051 microcontroller. **(06 Marks)**

c. What is PWM techniques? Explain directional motor control using L293 clip. If SW = 0 the DC motor rotates clockwise and if SW = 1. DC motor rotates counter clockwise. Write the assembly program to do this. **(06 Marks)**

OR

10 a. Explain with a neat diagram the interfacing of DAC0808 to 8051 chip. **(06 Marks)**

b. Explain with a neat diagram, the functional block diagram of 8255. **(08 Marks)**

c. Write an 8051 C program to send letters 'B', 'Y' and 'E' to LCD using delays. **(06 Marks)**

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