CBCS SCHEME

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17EE52

# Fifth Semester B.E. Degree Examination, July/August 2022
## Microcontroller

Time: 3 hrs. Max. Marks: 100

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



### Module-1

1 a. What is microcontroller? Compare microprocessor and microcontroller. **(04 Marks)**

b. Explain the block diagram of 8051 microcontroller. **(10 Marks)**

c. Explain the program status word and flag bits. **(06 Marks)**

**OR**

2 a. Explain the internal RAM organization of 8051 with a neat diagram. **(08 Marks)**

b. How many address lines are required for accessing the data in the following memory ICS while data is organized as bytes. (i) 1024 byte ROM (ii) 16K RAM **(04 Marks)**

c. Explain the various addressing modes of 8051 with an example for each. **(08 Marks)**

### Module-2

3 a. What are assembler directives? Explain various assembler directives. **(08 Marks)**

b. Explain the operation of following instruction of 8051:
(i) MUL AB (ii) DIV AB (iii) SWAP A (iv) ADD A, @$R_0$ **(08 Marks)**

c. Write a program to convert decimal digit to displayable ASCII digits. **(04 Marks)**

**OR**

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

b. Identify the addressing modes in the following instructions:
(i) MOV A, 45H (ii) ADD A, #0 (iii) INC R2 (iv) MOV A, @$R_0$ **(04 Marks)**

c. Write a program to toggle the bits of port 1 with a delay which depends on the value of a number in $R_0$. **(08 Marks)**

### Module-3

5 a. Explain the various data types in 8051 C. **(08 Marks)**

b. Write an 8051 C program to convert ASCII digit of '4' and '7' to packed BCD and display them on P1. **(06 Marks)**

c. With a frequency of 22 MHz, generate a frequency of 100 kHz on pin P2.3. Use timer 1 in the mode 1. **(06 Marks)**

**OR**

6 a. Describe bits of TMOD register and various operating modes in detail. **(10 Marks)**

b. Write an 8051 C program to toggle all bits of P2 continuously every 500 ms. Use Timer 7, mode 1 to create the delay. **(10 Marks)**

### Module-4

7 a. What is serial data communication? Explain Simplex, half duplex and full duplex transfer. **(06 Marks)**

b. Explain the use of various bits of SCON SFR. **(08 Marks)**

c. Write a C program for the 8051 to transfer the letter 'A' serially at 4800 baud continuously. Use 8 bit data and 1 stop bit. **(06 Marks)**

**OR**

8 a. What is an interrupt? Explain the steps in executing an interrupt. **(08 Marks)**

b. Describe the bits of TCON register. **(06 Marks)**

c. With XTAL = 11.0592 MHz, find the TH1 value needed to have the following baud rates:
(i) 9600 (ii) 2400 (iii) 1200 **(06 Marks)**

## Module-5

9 a. Explain matrix keyboard connection to ports of 8051. **(08 Marks)**

b. Write short notes on:
(i) MAX 1112 ADC
(ii) DAC 0808
(iii) Relay and Relay diagram **(12 Marks)**



**OR**

10 a. Draw the control word format of 8255 and explain various modes of 8255. **(08 Marks)**

b. Define Stepper motor and explain 8051 connection to stepper motor. **(06 Marks)**

c. 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, the stepper motor moves clockwise.
(ii) If SW = 1, the stepper motor moves counter clockwise. **(06 Marks)**

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