CBCS SCHEME

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17EE52

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021
Microcontroller

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Give the basic block diagrams of a microprocessor and a microcontroller. Justify that a microcontroller is an on chip computer. **(06 Marks)**

b. Show the stack contents, SP contents and contents of any register affected after each step of the following sequence of operations:

MOV SP, #70H
MOV R5, #30H
MOV A, #44H
ADD A, R5
MOV R4, A
PUSH 4
PUSH 5
POP 4 **(06 Marks)**

c. Explain the internal RAM section of 8051 microcontroller with required diagrams. **(08 Marks)**

OR

2 a. Explain the function of following pins of 8051:
i) $\overline{EA}$ ii) ALE iii) $\overline{PSEN}$ iv) RST **(08 Marks)**

b. For the following microcontroller ICS, determine the ROM memory address of AT89C51 with 4KB, DS89C420 with 16KB and DS5000 with 32KB. **(06 Marks)**

c. With the help of timing diagram, explain how to interface 8K EPROM and 4K RAM to 8051. **(06 Marks)**

Module-2

3 a. Write a program to load accumulator with the value of 55h and complement the content of accumulator 900 times. **(06 Marks)**

b. Explain the operation of following instructions of 8051 with examples:
i) RLC A ii) DA A iii) DJNZ R3, next iv) XCHD A, @Ri **(08 Marks)**

c. Explain the following assembler directives: i) DB ii) ORG iii) EQU **(06 Marks)**

OR

4 a. Explain the different types of conditional and unconditional jump instructions of 8051. Specify the different ranges associated with jump instructions. **(08 Marks)**

b. Write a program to convert hexadecimal number to decimal. Include suitable comment. **(06 Marks)**

c. With the relevant figure, write a sequence of events that occur in 8051 microcontroller when the CALL and RET instructions are executed. **(06 Marks)**

Module-3

5 a. What are the various data types supported by 8051C? Mention the range of representation in each case. **(06 Marks)**

b. Write an 8051C program to toggle all the bits of P_0, P_1 and P_2 continuously with a 250ms delay. Use the EX-OR operator. **(06 Marks)**

c. Write an 8051C program to realize a square wave of frequency 2kHz on P2.0. Use timer 1, mode 1 for the operation. Take crystal frequency as 11.0592 MHz. **(08 Marks)**

OR

6 a. Write an 8051 'C' program to convert packed BCD 0X29 to ASCII and display bytes on P_1 and P_2. **(06 Marks)**

b. Explain TMOD-SFR with necessary format. **(06 Marks)**

c. A switch is connected to pin P1.2. Write an 8051C program to monitor 'SW' and create the following frequencies on Pin P1.7:
SW = 0 : 500Hz
SW = 1 : 750Hz
Use timer '0', mode '1' for both of them. Assume crystal frequency = 11.0592 MHz. **(08 Marks)**

Module-4

7 a. Explain the bit pattern of SCON register. **(06 Marks)**

b. Write an 8051 program to send the data message "MICROCONTROLLER" serially at 9600 band rate, 8 bit data and one stop bit, continuously. **(06 Marks)**

c. Compare polling and interrupt. Explain the six interrupt of 8051 with interrupt vector table. **(08 Marks)**

OR

8 a. Write an 8051 C program to do the following:
i) Continuously read the status of switch SW connected to pin P1.2 and send it to pin P2.1 in the main program.
ii) Generate a square wave of 100μsec delay on pin P2.3 and send character '*' continuously serially using timer and serial interrupt routines respectively.
Use XTAL = 11.0592MHz and 8 data bits, 1 stop bit, 4800 band rate format. **(08 Marks)**

b. Write an ALP for 8051 to transfer the letter 'A' serially at 4800 baud rate continuously. Use 8-bit data and 1 stop bit. Use timer 1 in mode 2. **(06 Marks)**

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

Module-5

9 a. Explain the steps to interface ADC 0808 to the 8051 microcontroller. **(08 Marks)**

b. Explain the Registers and pins of LCD and write an ALP to display "VTU" on LCD display. **(08 Marks)**

c. Explain the control word format of 8255. **(04 Marks)**

OR

10 a. Write a program to rotate a stepper motor 64° in the clockwise direction. The motor has a step angle of 2°. **(06 Marks)**

b. Find the control word for the following configurations:
i) All ports of A, B and C are output ports (mode 0)
ii) PA = 1N, PB = OUT, PCL = OUT and PCH = OUT **(06 Marks)**

c. Show a simple keyboard interface with port of 8051 and explain its operation. **(08 Marks)**

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