CBCS Scheme

USN | 1 | A | Y | 1 | 5 | M | T | 0 | 2 | 6 | | | 15MT43

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Microcontroller

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Define microcontroller. Explain the salient features of 8051 microcontroller along with block diagram. **(10 Marks)**

b. Differentiate between :
i) Harvard and von-neuman memory architecture
ii) RISC and CISC. **(06 Marks)**

OR

2 a. Explain the memory organization of 8051 microcontroller mentioning the significance of PC (program counter). **(08 Marks)**

b. Along with timing diagram, show the hardware schematic interfacing of 8051 with 8K external ROM memory. **(08 Marks)**

Module-2

3 a. Define addressing mode. Explain the different addressing modes of 8051 along with an example for each. **(07 Marks)**

b. Explain the operation performed by the following instructions :
i) DA A ii) MOV C, bit address. **(04 Marks)**

c. Explain how data can be stored and retrieved in stack memory. **(05 Marks)**

OR

4 a. With a neat diagram explain the significance of stack memory, when a call is made to subroutine. **(06 Marks)**

b. Write an ALP to perform the following operation :
$Y = (x_1 + y_1) * (x_2 + y_2)$ where x_1, x_2, y_1 and y_2 are the 8-bit hexadecimal numbers stored in RAM location. **(07 Marks)**

c. Mention the different ranges associated with JUMP and CALL instruction. **(03 Marks)**

Module-3

5 a. Write a C program to transmit the value 55h serially one bit at a time via P3.5 depending on switch condition. When SW = 0; LSB should go out first, when SW = 1 ; MSB should go out first. A switch (SW) is connected to P1.5. **(08 Marks)**

b. Explain the methods of generating delay in 8051 microcontroller. **(04 Marks)**

c. Explain the following C data types along with an example :
i) sfr ii) sbit iii) bit iv) unsigned int. **(04 Marks)**

OR

6 a. Explain the steps to program timers in mode 1 along with relevant block diagram. **(06 Marks)**

b. Assume XTAL = 22MHz, write an ALP to generate square wave of 3 m sec period on P2.4. Use timer –1 in mode 1, 50% duty cycle. **(06 Marks)**

c. Explain TMOD SFR bit pattern. **(04 Marks)**

Module-4

7 a. Write an ALP to transfer message "VTU" serially at 9600 baud rate, 8bit data and 1stop bit. **(06 Marks)**

b. Explain the significance of TI and RI flag bits. **(06 Marks)**

c. Differentiate between synchronous and asynchronous communication. **(04 Marks)**

OR

8 a. Explain IE and IP bit pattern. **(06 Marks)**

b. What is interrupt vector table? explain the different interrupts present in 8051 along with its priority and vector address. **(08 Marks)**

c. Differentiate between polling and interrupt. **(02 Marks)**

Module-5

9 a. Explain the working of stepper motor in anticlockwise direction with the hardware schematic and C program. **(08 Marks)**

b. Write a C program to display "INDIA" on LCD by 8051 Microcontroller. Give the pin details of 16 × 2 LCD. **(08 Marks)**

OR

10 a. With a block diagram, explain the procedure involved to interface 4 × 4 matrix keyboard with 8051 along with program. **(08 Marks)**

b. Write a C program to generate sine wave by interfacing 8051 with DAC. Explain the significance of DAC in wave form generation. **(08 Marks)**

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