CBCS SCHEME

USN | | | | | | | | | | 15EE52

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Microcontroller

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Draw the programming model of 8051 µc. Explain the function of following :
(i) Accumulator, Register B and CPU Registers.
(ii) Program controller, Stack and Stack pointer **(10 Marks)**

b. After adding the following data, show the states of CY, AC and P flags:
(i) 55h and AAh
(ii) 12h and 62h **(06 Marks)**

OR

2 a. Explain the internal RAM organization of 8051 with suitable diagrams. **(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) 512 bytes RAM (ii) 8K RAM. **(04 Marks)**

c. Explain the program ROM space allocation for the following :
(i) EA = 0 for 8751 chip (ii) EA = V_{CC} with both on-chip and off-chip ROM for 8751. **(04 Marks)**

Module-2

3 a. Explain the following assembler directives:
(i) DB (ii) ORG (iii) EQU **(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 R6. **(04 Marks)**

OR

4 a. Write a program to complement the value AAh, 800 times. **(04 Marks)**

b. With respect to Port 0, explain the following :
(i) Working of Port 0
(ii) Dual role of Port 0
(iii) Example program to use Port 0 as input and output. **(08 Marks)**

c. Write a program to generate a square wave of 50% duty cycle on bit 5 of Port-2. **(04 Marks)**

Module-3

5 a. Write an 8051 'C' program to send values – 4 to +4 to Port P1. **(05 Marks)**

b. Write 8051 'C' program to toggle all the bits of P0 and P2 continuously with 250 ms delay. **(05 Marks)**

c. Write an 8051 'C' program to convert packed BCD 0×28 to ASCII and display bytes on P1 and P2. **(06 Marks)**

OR

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

b. Write 8051 assembly program to generate square wave with t_{ON} = 3ms and t_{OFF} = 10ms on all pins of Port 0. System clock is 22 MHz. Use timer 0 in Mode-1. **(08 Marks)**

Module-4

7 a. Describe bit status of SCON register. **(08 Marks)**

b. Write 8051 assembly program to receive the data in serial form and send it out to Port-0 in parallel form. Save the data in RAM location 62h. Assume baud rate = 9600. Use timer 1 in Mode 2. **(05 Marks)**

c. Calculate the baud rate if TH1 = – 2, SMOD = 1, XTAL = 11.0592 MHz. Is this baud rate supported by IBM PCS? **(03 Marks)**

OR

8 a. Explain the steps in executing an interrupt. **(04 Marks)**

b. Write 8051 assembly program in which 8051 reads data from P1 and writes it to P2 continuously while giving a copy of it to serial COM port to be transferred serially. Assume baud rate = 9600 and XTAL = 11.0592 MHz. Use timer –1 in mode 2. **(08 Marks)**

c. Explain the bit status of IP Register. **(04 Marks)**

Module-5

9 a. Calculate the address range of 16×2 LCD and 20×1 LCD. **(03 Marks)**

b. Explain the internal architecture of ADC 0804 and its timing diagram to convert analog data to digital form. **(10 Marks)**

c. Consider 8 bit ADC. Assume V_R = 5V. Calculate the 8 bit digital output when V_{in} = 3V. **(03 Marks)**

OR

10 a. Write 8051 assembly program to rotate a stepper motor 64° in clockwise direction. The motor has step angle of 2°. Use 4 step sequence and draw the schematic diagram. Steps per revolution = 180, number of rotor teeth = 45. Movement per 4 step sequence = 8°. **(08 Marks)**

b. What is PWM technique? Explain bidirectional motor control using L293 chip. If SW = 0, the dc motor moves clockwise and if SW = 1, the dc motor moves counter-clockwise. Draw the schematic diagram. Write 8051 assembly program to do this. **(08 Marks)**

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