CBCS SCHEME

USN | | | | | | | | | | |

15EC563

Fifth Semester B.E. Degree Examination, June/July 2018
8051 Microcontroller

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Differentiate between microprocessor and microcontroller with respect to their architecture and instructions. **(06 Marks)**

b. With a diagram, explain the architecture and features of 8051 Microcontroller. **(10 Marks)**

OR

2 a. What is an embedded system and embedded microcontroller? **(02 Marks)**

b. Explain the oscillator circuit and a machine cycle of 8051 microcontroller. **(06 Marks)**

c. Explain the internal memory organization in 8051. **(08 Marks)**

Module-2

3 a. Explain the different addressing mode of 8051. Give an example for each one of them. **(08 Marks)**

b. Mention the function of the following instructions of 8051 CPU :
i) MOVC A, @A+DPTR ii) DA A iii) SJMP rel iv) DJNZ Rn, rel. **(05 Marks)**

c. Explain the functions of following pins of 8051: i) ALE ii) $\overline{EA}$ iii) RST. **(03 Marks)**

OR

4 a. Explain all the formats of XOR and AND operations in 8051. **(06 Marks)**

b. Which of the following 8051 instructions are wrong and why?
i) MOV A, @R3
ii) MOV R1, R2
iii) ADD 10H, 11H
iv) INC DPTR. **(04 Marks)**

c. Assume that register A has packed BCD, write an 8051 ALP program to convert packed BCD to two ASCII numbers and place them in address 60_H and 61_H. **(06 Marks)**

Module-3

5 a. With a neat diagram, explain the sequence of events of PUSH, POP, ACALL and RET instructions stack area of internal RAM. **(08 Marks)**

b. Write an ALP to find average of 10 numbers stored in external memory from 1000_H. Store result at 2000H. Assume sum of those 10 numbers does not exceed 8 bits. **(08 Marks)**

OR

6 a. Write an ALP to find largest of five 8 bit numbers (without sorting) stored from location 20_H. **(08 Marks)**

b. Write an ALP to move block of 10 data from internal data memory 30_H to external data memory 9000_H. **(08 Marks)**

Module-4

7 a. Distinguish between counter and timers of 8051. Explain the mode 1 and mode 2 operation of timer/counter of 8051. How to start/stop timers of 8051. **(08 Marks)**

b. Write an ALP to generate a rectangular wave with an ON time of 3ms and an OFF time of 10ms on all pins of port 0. Assume XTAL of 22MHz. Use timer0 in mode 1. **(08 Marks)**

OR

8 a. Explain the functions of RS232 pins of DB-9 connector. **(04 Marks)**

b. Explain the procedure 8051 follows to transmit and receive characters serially. **(06 Marks)**

c. Write a program for 8051 to transfer the message "GOOD LUCK" serially at baud rate of 9600, 8 bit data with 1 stop bit. Do this continuously, use assembly language. **(06 Marks)**

Module-5

9 a. Explain 8051 interrupts and the procedure to enable/disable/mask them. **(08 Marks)**

b. Write a C-program that continuously gets a single bit of data from $P_{1.7}$ and sends it to $P_{1.0}$, while simultaneously creating a square wave of 200μs period on pin $P_{2.5}$. Use timer0 to create the square wave. Assume XTAL = 11.0592 MHz. **(08 Marks)**

OR

10 a. Show an interface of 8051-Microcontroller with a stepper motor drive circuit and write an ALP to rotate it 5 steps counter clockwise. **(08 Marks)**

b. Interface ADC-0804 to 8051-Microcontroller and write a program in assembly level to read analog data and display the converted data at Port 2. **(08 Marks)**

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