Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016

Subject Code: 160903 Date: 22/10/2016

Subject Name: Microcontroller

Time: 10:30 AM to 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1

(a) In what way microcontroller differs from microprocessor? Give an overview of 8051 microcontroller family. (7)

(b) Draw and explain the internal RAM and ROM structure of 8051 microcontroller Is it possible to connect external memory to microcontroller? If yes, which pins of microcontroller will function as address and data bus. (7)

Q.2

(a) Draw and explain the functional block diagram of 8051 microcontroller (7)

(b) Give the function of following pins of 8051 (i) PSEN (ii) EA (iii) TXD (iv) ALE (7)

OR

(b) What would be the contents of stack pointer when RESET is activated in 8051? Explain stack related instructions in 8051 with appropriate examples (7)

Q.3

(a) Write an ALP to copy the data from internal RAM locations 12H to 15H to internal RAM locations 20H to 23H. Use indirect addressing and branching group instructions (7)

(b) Write an ALP to check the lower nibble of any number placed in register 'A'. If it larger than upper nibble, set the CY flag to 1, otherwise clear it (7)

OR

Q.3

(a) Discuss TCON and TMOD special function registers. Explain significance of each bit (7)

(b) Write an ALP generate a pulse width of 5 ms on pin P2.4. Use timer 0 in mode 1. Show delay calculations assuming clock frequency to 11.0592 MHz (7)

Q.4

(a) How many timers are there in 8051? Discuss the different modes in which 8051 timers can operate. (7)

(b) Discuss the different interrupts available in 8051 along with their priorities. Explain how these interrupts can be enabled or disabled using IE register (7)

OR

Q.4

(a) Write a C program to toggle all the bits of P0 and P2 continuously with a 250 ms delay. Assume clock frequency of 11.0592 MHz (7)

(b) Program the 8051 in C to receive bytes of data serially and put them in P1. Set the baud rate at 4800, 8 bit data and 1 stop bit (7)

Q.5

(a) Explain how LCD can be interfaced with 8051? Write an ALP to initialize the LCD and hence display 'YES' on its screen. (8)

(b) With the help of a neat diagram explain how a temperature sensor can be connected with 8051 microcontroller (6)

OR

Q.5

(a) What is a stepper motor? Explain how stepper motor can be interfaced with 8051? (7)

(b) Explain how DC motor control can be achieved using microcontroller (7)

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