Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – WINTER • 2014

Subject Code: 160903 **Date: 01-12-2014**

Subject Name: Microcontroller

Time: 02:30 pm - 05:00 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) Answer the following questions in brief (6)

(i) How AJMP differs from LJMP ?

(ii) On returning from subroutine where will the next instruction be taken from?

(iii) What is the dual role of port 2?

(iv) If OV flag is set after MUL AB instruction, what does it indicate?

(v) What is baud rate and which mode of timer is used for baud rate programming?

(vi) What is RETI instruction? Why it is required at the end of ISR?

(b) Draw and explain the functional block diagram of 8051 microcontroller in brief (8)

Q.2

(a) Discuss the different types addressing modes available in 8051 with suitable illustrations (7)

(b) Draw and explain structure of P0 and P1 ports in 8051 microcontroller (7)

OR

(b) Explain how external ROM and RAM can be accessed? Write an ALP to divide the data in RAM location 15H by the data in RAM location 16H. Put the quotient and remainder in external RAM locations 2000H and 2001H (7)

Q.3

(a) Write an ALP to count the number of 0's of any number in register R3 and put the count in register R5 (7)

(b) Assuming that clock pulses are fed into T1 (P3.5), write a program for counter 1 in mode 2 to count the pulses and display the state of TL1 count on LED's connected to P2 (7)

OR

Q.3

(a) Explain TCON and TMOD special function registers. Also discuss how external interrupts can be made edge triggered by setting appropriate bits in TCON (7)

(b) How serial data transmission can be done using SCON and SBUF register? Which options are available to increase data transfer rate in 8051? (7)

Q.4

(a) State and explain the major reasons for writing microcontroller programs in C instead of assembly language (6)

(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 (8)

OR

Q.4

(a) Discuss the different types of interrupts available with 8051. State their priorities (7)

and vector addresses

(b) Write a C program that continuously gets a single bit of data from P1.7 and sends it to P1.0, while simultaneously creating a square wave of 200 μS on pin P2.5. Use timer 0 to create the square wave. Assume XTAL = 11.0592 MHz (7)

Q.5

(a) With the help of neat diagram explain how ADC can be interfaced with 8051? Also show how clock source for ADC can be obtained from XTAL of 8051? (7)

(b) Explain how the speed and direction of DC motor can be controlled using microcontroller (7)

OR

Q.5

(a) Discuss how universal, unipolar and bipolar stepper motor interfacing can be identified ? Explain interfacing of unipolar stepper motor with microcontroller (7)

(b) Explain LCD interfacing with 8051 microcontroller (7)

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