Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: 172001 Date: 26-11-2013

Subject Name: Microcontrollers and Embedded Systems

Time: 10.30 AM - 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)**	Define embedded systems with examples. Differentiate between Von-neuman & Harvard architecture with figure. State the bit wise operators in C.	**07**
	(b)	Draw and explain the programming model of PIC18F452.	**07**
Q.2	**(a)**	Explain bidirectional control of DC motor using H-bridge circuit in detail.	**07**
	(b)	Explain the bit configuration of INTCON & T0CON SFRs of PIC18F452.	**07**
		OR	
	(b)	Explain bit configuration of PIR1 & T1CON SFRs of PIC18F452.	**07**
Q.3	**(a)**	Interface a single channel ADC with AT89C51.	**07**
	(b)	Explain the bit manipulation instructions in PIC18F452.	**07**
		OR	
Q.3	**(a)**	Interface a generalized LCD with AT89C51.	**07**
	(b)	Explain the instructions related to stack & subroutines in PIC18F452.	**07**
Q.4	**(a)**	Write a C program to transmit following data serially at maximum baud rate possible. A switch (SW) is connected to P2.4. If SW=0 transmit “Jelly bean” & SW=1; transmit “KitKat”	**07**
	(b)	Write 8051 C programs for the following: i.) to find checksum for the code bytes 0x41,0x3C,0x55,0x7A. ii.) to unpack a BCD byte & send complimented values of LSB to port P1 & MSB to port P2. Write the output P1=___,P2=___	**07**
		OR	
Q.4	**(a)**	Write a C program to generate two different frequencies based upon switch positions. SW=0; 4kHz on P2.3 & SW=1; 7.5kHz on P2.4. SW is connected to P2.2. XTAL = 12MHz. Use timer1 mode2.	**07**
	(b)	Write 8051 C programs for the following: i.) to send ASCII values of hex data 0x01,0x02,0x0A,0x0B to port P2. ii.) to send out the value 44H serially one bit at a time via P1.0. The LSB should go out first.	**07**
Q.5	**(a)**	Write a program to add an array of 10 numbers starting from address 0x50 and save LSB & MSB of the sum in file registers.	**07**
	(b)	Write instructions to set up INT1 as high priority interrupt & set up a counter to count first 10 interrupts. Increment count on rising edge in PIC18F452.	**07**
		OR	
Q.5	**(a)**	Write a subroutine to set up timer1 in 16 bit mode with internal clock at 10MHz to generate 200ms delay.	**07**
	(b)	Write an assembly program to copy an array of 5 bytes from program memory 0x02000 to data registers staring from address 0x20.	**07**

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