GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – V (NEW) EXAMINATION – WINTER 2015

Subject Code: 2150306   **Date:08/12/ 2015**
Subject Name: Microcontroller & Interfacing (Biomedical)
Time:10:30am to 1:00pm   **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)**	Draw architecture of 8051 microcontroller. List comparison of 8051 family members.	**07**
	(b)	Explain the following instructions with example: (1) EQU, (2) DA A, (3) INC @Ri, (4) JBC bit, target , (5) XCHD A, @Ri, (6) SWAP A , (7) RR A	**07**
Q.2	**(a)**	Answer the following:	**07**
		(1) What does 'C' stand for in AT89C51 microcontroller?	
		(2) When does OV flag set?	
		(3) What are the contents of the SP register upon RESET of the 8051?	
		(4) Why does port 0 need pull up register?	
		(5) Explain PSEN.	
		(6) List the 8051 interrupt priority upon RESET (highest to lowest priority).	
		(7) Explain PSW register of 8051.	
	(b)	(i) Draw and explain oscillator circuit and timing diagram of the 8051.	**04**
		(ii) Explain BIT addressable instructions with examples.	**03**
		OR	
	(b)	Explain in detail IE, TCON and TMOD special function registers.	**07**
Q.3	**(a)**	Explain in detail auto-reload mode of 8051 timers with necessary diagram. Prepare an ALP (Assembly language program) to generate continuous square wave of 50% duty cycle using auto-reload mode.	**07**
	(b)	Draw and explain 4×4 matrix keyboard interfacing to the ports of 8051.	**07**
		OR	
Q.3	**(a)**	Write a program to toggle pin P1.2 every second continuously using interrupt service routine.	**07**
	(b)	Design and explain the 8051 microcontroller connection to external Data Memory of 16K bytes.	**07**
Q.4	**(a)**	Double the number in register R2, and put the result in R3 (high byte) and R4 (low byte) without using instructions ADD, MUL.	**07**
	(b)	Draw and Describe in detail the 8051 interfacing with DC motor through optoisolator.	**07**
		OR	
	(a)	Explain with diagram interfacing stepper motor with 8051 microcontroller and code a program to rotate it continuously.	**07**
	(b)	Ten hex numbers are stored in RAM location 55H onwards. Write an ALP to find the biggest number in the set and save that number in 65H.	**07**
Q.5	**(a)**	Write a C program to send letters 'P', 'Q' and 'R' to the LCD using delays.	**07**
	(b)	Write an ALP using interrupts to read the data from P1 and send it to P2	**07**

continuously while giving copy of it to the serial port to be transferred serially. XTAL = 11.0592 MHz. Baud rate at 9600

OR

Q.5 **(a)** Design 8051 connection to LCD. Write commands to display the message 'BE POSITIVE'. **07**

(b) Describe necessary steps to program the 8051 to receive the data serially and explain the importance of the RI flag bit. **07**

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