Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – V (NEW) EXAMINATION – WINTER 2015

Subject Code: 2152409 **Date:17/12/ 2015**

Subject Name: Micro Controller for Power Electronics

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.**
4. **For assembly language programs, clearly mention comment after instructions for clarity of logic.**
5. **Answer the theoretical questions point wise.**
6. **Write ONLY required answer. Do not write very long answers unnecessarily.**

Q.1	**(a)**	State names of bus available in a processor and function of each. Explain why MCS-51 is 8 bit microcontroller.	**07**
	(b)	Draw timing diagrams of external data memory read and external program memory read cycles of MCS-51. W.R.T. timing diagram state basic difference between these operations.	**07**
Q.2	**(a)**	State different addressing modes. Give example of each with reference to 8051.	**07**
	(b)	Draw block diagram of 8085 microprocessor.	**07**
		OR	
	(b)	Draw block diagram of 8051 microcontroller.	**07**
Q.3	**(a)**	State instructions for arithmetic operations available in MCS-51. Explain ADD and SBB instructions. Also state flags affected by the instructions.	**07**
	(b)	Write a function/subroutine to add two digit packed BCD numbers. Clearly state the function of each instruction in the program.	**07**
		OR	
Q.3	**(a)**	State instructions available in MCS-51 for changing normal execution sequence of program. Explain instructions which should be compulsorily used for using functions /subroutines.	**07**
	(b)	Explain role of PC in any microprocessor/ Controller. In case of MCS-51 what is default value stored in PC at power ON? What will be the stored value in PC before and after execution of following instruction? (Assume HERE = 1000H) HERE: SJMP HERE	**07**
Q.4	**(a)**	It is required to generate a square wave with a frequency of 1 KHz at P0.0 pin of 8051. With necessary details explain various SFR settings required and write ISR to fulfill this. Assume that the crystal frequency is 12MHz.	**07**
	(b)	Draw output stage hardware diagram for the port 1 and port 3 pin. Also state how they are different. If a port pin is to be initialized as output, what step should be taken before outputting the data on that pin?	**07**
		OR	
Q.4	**(a)**	Draw hardware diagram required for interfacing 4 seven segment display and 4 push buttons with 8051. Assume that only 11 I/O lines (P0.0-P0.7 and P1.0-P1.2) are free for interfacing the display and keyboard to microcontroller.	**07**
	(b)	For the hardware of above (a), write a program to display 1234 on the seven segment displays.	**07**

Q.5	**(a)**	Write an ALP for adding two 32 bit numbers. Assume that the numbers are stored as follows. (1) No. 1→ R0, R1, R2, R3 (LS Byte in R0). (2) No.2 → R4, R5, R6, R7 (LS Byte first. Store the result in place of the first number.	**07**
	(b)	What are assembler directives? State five assembler directive with their meaning. Explain how assembler directives are useful while writing ALP.	**07**

OR

Q.5	**(a)**	State interrupts available in basic MCS 51 micro controller. Explain the sequence of operations after occurrence of interrupt.	**07**
	(b)	Write a program to read a BCD digit from P0.0 to P0.3 connected to external hardware. Multiply the read digit by 2.5 (i.e. 5/2). Write two digit (packed BCD) answer on P1.	**07**

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