Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2151707 **Date: 05/05/2017**

Subject Name: Microcontroller and Interfacing

Time: 02:30 PM to 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.**
4. **Consider crystal frequency of 12MHz for microcontroller 8051 if not specified.**
5. **Comment lines are must in assembly and C programs.**

Q.1		**Short Questions**	**14**
	1	To mask certain bits we must AND them with _____.	
	2	What is the purpose of EA pin in microcontroller 8051?	
	3	When LCALL is executed , how many bytes of the stack are used?	
	4	What is the function of DPTR in microcontroller 8051?	
	5	What is the difference between 8031 and 89C51 microcontrollers ?	
	6	What are the conditions for setting the OV flag ?	
	7	What is the difference between a timer and a counter?	
	8	What is the difference between MOVC and MOVX ?	
	9	What precaution we should take before using SUBB instruction?	
	10	What is the function of GATE bit in TMOD SFR?	
	11	Write instruction(s) to select register bank 3.	
	12	What is the function of ALE signal in microprocessor 8085?	
	13	What do you mean by indirect addressing mode?	
	14	_____ takes more ROM space in 8051. (SJMP,LJMP,JNC)	
Q.2	**(a)**	Explain bitwise shift operators in C with appropriate example of each.	**03**
	(b)	Exchange lower nibbles of R1 and internal RAM 42H without using logical instruction.	**04**
	(c)	Interface a seven segment common anode display with microcontroller 8051. Write an 8051 assembly language program to display numbers from 0 to 9 at every second using loop.	**07**
		OR	
	(c)	Write an 8051 assembly language program to convert a binary number stored in external RAM address 2000H, into its equivalent BCD code. Store BCD code in internal RAM address beginning from 30H.	**07**
Q.3	**(a)**	List and explain generation of control signals for memory and input/output devices for read and write operations in microprocessor 8085.	**03**
	(b)	With the help of neat diagram explain demultiplexing in microprocessor 8085.	**04**
	(c)	Interface (i) 32K EPROM and (ii) 8K RAM memories with microcontroller 8051. Write memory address ranges and draw the complete interface diagram.	**07**
		OR	
Q.3	**(a)**	Draw the neat diagram of internal memory organization of microcontroller 8051.	**03**
	(b)	What is Assembler directive? Explain assembler directives ORG and EQU with example.	**04**

	(c)	Interface (i) 8K EPROM and (ii) 4K RAM memories with microprocessor 8085. The EPROM address should begin from 0000H and the RAM address should begin at 8000H. Write memory address ranges and draw the complete interface diagram.	**07**
Q.4	**(a)**	Interface DAC 0808 with microcontroller 8051.	**03**
	(b)	Write a C program to generate a sawtooth wave using the DAC.	**04**
	(c)	Using timer0 of microcontroller 8051 in mode 1, generate a square wave with an ON time of 3 ms and an OFF time of 10 ms on all pins of port 1. Assume crystal frequency of 12 MHz Show your delay calculations.	**07**

OR

Q.4	**(a)**	Draw interfacing diagram of 8255 with microcontroller 8051 so that the addresses for Port A, Port B, Port C and Control Word Register are 4000H, 4001H, 4002H and 4003H respectively.	**03**
	(b)	Assume 8255 is connected with microcontroller 8051 and four switches are connected to port lines PA0-PA3. Write a program to transfer the status of these switches to LEDs connected to upper 4-bits of Port B. Assume port addresses specified in Q.4(a).	**04**
	(c)	Generate a square wave of frequency 2 KHz on pin P1.3 assuming crystal frequency of 12 MHz. Show your delay calculations.	**07**
Q.5	**(a)**	Draw interfacing circuit of DC motor with microcontroller 8051.	**03**
	(b)	How can we control the speed and direction of DC motor using PWM?	**04**
	(c)	Write a C program that continuously gets a single bit of data from P1.5 and sends it to P1.2, while simultaneously creating a square wave of 500 µs period on pin P2.4. Use timer 0 to create the square wave. Assume crystal frequency of 12 MHz. Show your delay calculations.	**07**

OR

Q.5	**(a)**	Draw interfacing circuit of LCD with microcontroller 8051.	**03**
	(b)	Write an 8051 C program to toggle bit D2 of the port P1 (P1.2) 20,000 times.	**04**
	(c)	Write an 8051 assembly language program to receive the data which has been sent in serial form and send it out to port 2 in parallel form. Also save the data at internal RAM location 50H.	**07**

****