Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2020

Subject Code:2160307 **Date:22/01/2021**

Subject Name:Embedded system Design

Time:02:00 PM TO 04:00 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define Embedded System. List out the features of PIC16F87X for Embedded System.	**03**
	(b)	What are the types of Embedded System? Explain the performance and functional based Embedded System in detail.	**04**
	(c)	Draw the architecture of PIC 16f87X. Explain each block in details.	**07**
Q.2	**(a)**	Define: 1) Compiler 2) Debugger 3) Baud Rate	**03**
	(b)	Explain the Reset and Oscillator Circuit with the help of diagram. Also, Mention the types of configuration bits for the Crystal Oscillator.	**04**
	(c)	Draw and explain the working operation of PORT C.	**07**
Q.3	**(a)**	Write a code to get a byte of data from PORT D. if it is less than 150, send it to PORT C. Otherwise send it to PORT B.	**03**
	(b)	Explain the for loop & if else with the help of example.	**04**
	(c)	Write a program to design Increment & Decrement Counter (0 – 99) on Seven Segment (CC) using two switches. One Switch is used to increment and another one is used for decrement. Make suitable assumptions.	**07**
Q.4	**(a)**	Explain the While and Do -While structure with the help of example.	**03**
	(b)	Write a c code to interface the Relay with PIC16f87X.	**04**
	(c)	Explain the operation of ADC module with the help of SFR. Write a syntax to enable the ADC module for Channel 0.	**07**
Q.5	**(a)**	Write a c program to toggle all the bits of PORT C continuously with 250ms delay (Crystal – 10 MHz) Design delay function.	**03**
	(b)	Write a c program to display “Biomedical” on 16*2 LCD, line no. 1 and “SEM 6” on line no. 2. Make suitable assumptions.	**04**
	(c)	Write a Program to interface DC Motor using PIC16f87X. Also, draw the schematic diagram for the same. (Use L293D as DC Motor Driver)	**07**
Q.6	**(a)**	Find the content after each operation. 1) 0x9A >> 3 2) 0x54 ^ 0x78 3) 0xA7 << 2	**03**
	(b)	Explain the SFR for timer 0 in detail.	**04**
	(c)	Write a program to generate square wave with the frequency 1 Hz using Timer 2. (Crystal Freq: 4 MHz, PR2 = 200, Prescaler 4, No Postscaler)	**07**

Q.7	**(a)**	A PIC 16is connected to the 10MHz Crystal Oscillator. Calculate the conversion time for Fosc/16 and Fosc/64.	**03**
	(b)	Explain the TXSTA & RCSTA SFR for serial communication.	**04**
	(c)	Write a Program to interface the Ultrasonic Sensor with Arduino Uno and display the output on LCD. Make suitable assumptions wherever necessary	**07**
Q.8	**(a)**	Draw the Pin Diagram of ATmega 328(Arduino UNO). List out the features of Arduino Uno.	**03**
	(b)	Write a c program to send data of PORT B to Computer using 9600 baud rates.	**04**
	(c)	Write a program to read the data of LM35 (Temperature Sensor) using channel A1 of PIC16F87X MCU and display on LCD. Also, draw the necessary diagram for the same. Make suitable assumptions.	**07**

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