

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER- V EXAMINATION-SUMMER 2023****Subject Code: 2151001****Date: 22/06/2023****Subject Name: Microcontroller and Interfacing (EC)****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. Simple and non-programmable scientific calculators are allowed

		Marks
Q.1	(a) Differentiate Microprocessor and Microcontroller	03
	(b) List down the number of ports available in ATmega32. Mention the steps to configure them as input and output ports.	04
	(c) Draw the internal block diagram of Atmega32 microcontroller.	07
Q.2	(a) List down the features of Atmega32 Microcontroller	03
	(b) What are pseudo codes? Explain any three in detail with examples.	04
	(c) Classify instruction set of AVR microcontroller. Explain them in detail with examples.	07
	OR	
	(c) Explain with examples rotate and shift instructions of Atmega32 Microcontroller.	07
Q.3	(a) Differentiate RISC and CISC instruction set.	03
	(b) Write a loop to generate delay of 100ms with XTAL frequency as 8MHz.	04
	(c) Draw TIMSK register and explain each bit. Show the instructions to enable the timer0 overflow interrupt and timer2 compare match interrupt.	07
	OR	
Q.3	(a) Define interrupt. List down steps to be taken before execution of an interrupt.	03
	(b) Using timer, generate delay of 1 second with XTAL frequency as 8MHz.	04
	(c) Explain TIFR register and also write the steps to program timer2 in normal mode.	07

- Q.4 (a)** Write down the various data types with range used in embedded C programming. **03**
- (b)** Explain simplex, half and full duplex transfers of data communication **04**
- (c)** Interface 8 LEDs and a switch with AVR controller and write a program to demonstrate up/down counter with mod control. **07**
- OR**
- Q.4 (a)** Discuss how branch instructions are executed. **03**
- (b)** Explain CALL and RET instructions. **04**
- (c)** Write a C language program to monitor PB0 continuously and soon as it goes high activate the buzzer connected on PB1 and send a high to low pulse on PB2 **07**
- Q.5 (a)** Explain with diagram, working of relay. **03**
- (b)** Write down hex codes to display 0 to 9 on common cathode seven segment LED. **04**
- (c)** Draw and explain various control registers of UART communication in ATmega32. **07**
- OR**
- Q.5 (a)** Explain the concept of opto-isolator. **03**
- (b)** Write a note on I2C BUS protocol. **04**
- (c)** Write a program to display “Microcontroller” on LCD interfaced with ATmega32. **07**