

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2024

Subject Code:2151001

Date:20-11-2024

Subject Name:Microcontroller and Interfacing (EC)

Time:10:30 AM TO 01:00 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) What is the size of code and data memory in ATmega32 Microcontroller	03
	(b) Explain the criteria for selecting a microcontroller.	04
	(c) Explain various addressing modes of AVR microcontroller with appropriate example	07
Q.2	(a) What is the difference between Microprocessor and Microcontroller	03
	(b) Draw and explain the Data memory for the AVR with Extended I/O memory	04
	(c) Draw and explain the Harvard architecture in the AVR.	07
	OR	
	(c) Explain following instructions with appropriate example.	07
	1. SBRS	
	2. LDS	
	3. SWAP	
	4. MULS	
Q.3	(a) What is MACRO and how it is used?	03
	(b) Explain the following instruction with example	04
	1. RET 2. RCALL	
	(c) Discuss SPI bus protocol with reference to AVR microcontroller	07
	OR	
Q.3	(a) What are assembler directives? Explain any three assembler directives.	03
	(b) Draw and explain the status register of AVR Microcontroller	04
	(c) Draw block diagram of 8bit timer/counter and explain its operation.	07
Q.4	(a) Write an AVR C program to toggle all the bits of Port C 50 times.	03
	(b) Explain steps in executing interrupt in AVR ATmega32 microcontroller.	04
	(c) For AVR ATmega32 microcontroller, assume that INT0 pin is connected to a switch that is normally high. Write a C program that toggles PORTC.3, whenever INT0 pin goes low. Use external interrupt in level triggered mode. Explain your program with necessary comments.	07

OR

Q.4	(a) How to enable and disable interrupt in AVR ATmega32 microcontroller.	03
	(b) Which are the different timers are available in ATmega32. Explain the times 1 with necessary diagram.	04
	(c) Write an AVR 'C' program using Timer0 and Timer1 interrupt, generate square wave on PB1 and PB7 respectively while transferring data from port C to port D.	07
Q.5	(a) How does SPI bus protocol work?	03
	(b) Draw the interfacing diagram of keyboard with AVR microcontroller and explain its working.	04
	(c) Discuss temperature sensor interfacing with ATmega32 and write a program to display temperature on PORT B.	07
OR		
Q.5	(a) Explain functioning of DDRX, PORTX, and PINX registers with appropriate example.	03
	(b) Which are the different features of ADC in AVR?	04
	(c) With diagram explain LCD interfacing with ATmega32 microcontroller.	07
