GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–IV EXAMINATION – WINTER 2025

Subject Code:3141008   **Date:01-12-2025**

Subject Name: Microprocessor & Microcontroller

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 between microprocessor and microcontroller.	**03**
	(b)	What is an Embedded system? List different applications of microcontrollers as an embedded system.	**04**
	(c)	Draw the internal architectural block diagram of AVR microcontroller and explain the function of each block in brief.	**07**
Q.2	**(a)**	Compare Harvard Architecture and Von Neumann Architecture.	**03**
	(b)	Explain the functions of following pins of 8085. 1. HOLD 2. INTA 3.SID 4. RESET	**04**
	(c)	How many branch instructions are there is AVR? Explain them briefly.	**07**
		OR	
	(c)	What criteria do designers consider in choosing microcontroller? Explain in the brief reason for each criterion.	**07**
Q.3	**(a)**	Write a program to find no of 1s in given byte.	**03**
	(b)	What is the difference between RET and RETI instructions? Explain why we cannot use RET instead of RETI as the last instruction of an ISR	**04**
	(c)	Write a program to load 0x55 in PORTB register and complement PORTB 100 times.	**07**
		OR	
Q.3	**(a)**	Explain any three Bit manipulation instructions with example	**03**
	(b)	Write Pros and cons of C and assembly language programming	**04**
	(c)	Explain following instructions for ATmega32. (1) ROL (2) NEG (3) LDI (4) OUT (5) SBI (6) SBR (7) SWAP	**07**
Q.4	**(a)**	Draw and explain TCCR0 register for ATMega32.	**03**
	(b)	Explain the functioning of DDRX, PORTX, and PINX registers with appropriate example.	**04**
	(c)	Write a program in C to generate a square wave of 3 KHz on pin PORTB.3. Use XTAL= 8 MHz, Use timer 0.	**07**
		OR	
Q.4	**(a)**	What is the difference between JMP and RJMP?	**03**
	(b)	What is the function of status register? Explain and differentiate overflow flag and carry flag in context with AVR.	**04**
	(c)	Write an Embedded C program to create a square wave of 50% duty cycle on pin PORTB.5. Timer 2 is used to generate the time delay.	**07**
Q.5	**(a)**	Explain with neat diagram, stepper motor interfacing with AVR.	**03**
	(b)	List down the characteristics of ADC peripheral of ATMega32.	**04**
	(c)	List serial interrupts available in AVR microcontroller. Write an ALP to receive serial data through serial port and display the same on port C.	**07**
		OR	
Q.5	**(a)**	How to enable and disable interrupt in ATmega32?	**03**
	(b)	Write the steps for writing data from SPI Device in multi byte burst mode.	**04**
	(c)	With neat diagram and appropriate programming example discuss the interfacing of LCD with AVR microcontroller.	**07**

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