Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(NEW) EXAMINATION – WINTER 2022

Subject Code:3141008 Date:16-12-2022

Subject Name:Microprocessor & Microcontroller

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 importance of flags in Microprocessor and Microcontroller? Explain any three flag bits of 8085 Microprocessor or AVR Microcontroller.	**03**
	(b)	Explain need of Stack pointer and Program counter in Microprocessor and Microcontroller. What is the size of Program counter and Stack pointer in 8085 Microprocessor & AVR ATMega32 Microcontroller	**04**
	(c)	Discuss Architecture of AVR ATMega32 Microcontroller architecture. What features are different then 8085 Microprocessor architecture?	**07**
Q.2	**(a)**	512 Kbit Memory chip has 8 pins for data. Find out number of address lines in this chip.	**03**
	(b)	Give difference between Harvard and von Neumann architectures.	**04**
	(c)	What is the necessity of branch instructions and looping in microcontroller? Write assembly language program using branch instruction to load data 0xAA in PORTB and complement it 400 times	**07**
		OR	
	(c)	Explain relative call (RCALL) and indirect call (ICALL) instructions with example. What is the role of stack for CALL instruction?	**07**

Q.3	**(a)**	What will be status of C, H and Z flags after the addition of 0x38 and 0x2F using following instructions?
		LDI R16,0x38
		LDI R17,0x2F
		ADD R16, R17
			03

	(b)	Explain any four assembler directives with example	**04**
	(c)	Explain following instructions with example: (i) STS (ii) OUT (iii) SBIS (iv) ORI (v) CBI (vi) BLD (vii) BRBC	**07**
		OR	

Q.3	**(a)**	What will be status of overflow flag if numbers 0x60 and 0x46 added using following instructions?
		LDI R16,0x60
		LDI R17,0x46
		ADD R16, R17
			03

	(b)	Explain overflow problem in signed number operations. When overflow flag V set?	**04**
	(c)	Write assembly language program for following task: To monitor switch connected to port pin PB2 continuously. When switch is not pressed PB2 is high and when switch is pressed PB2 becomes low. When Switch is pressed write value 0x55 to port A else write 0x66 to port A.	**07**

Q.4	**(a)**	Write AVR program in C language to send values -10 to +10 to PORTB	**03**
	(b)	Write AVR C Program to get status of PB5 and send it to PC7 continuously.	**04**
	(c)	Explain steps for enabling external interrupts of AVR microcontroller. Write program to toggle port pin PC3 when external interrupt 0 occurs.	**07**

OR

Q.4	**(a)**	Discuss AVR fuse bits for oscillator clock source selection	**03**
	(b)	Explain working of brown out detector. Why brown out reset is important?	**04**
	(c)	Write AVR C program to generate square wave of 16 KHz with 50% duty cycle on PB5 pin using Timer 0 generated delay. Assuming Crystal of 8 MHz	**07**

Q.5	**(a)**	What is the use of UBRR register?	**03**
	(b)	For 8 bit ADC, Vref = 2.56 V Calculate D0-D7 output if analog input is 2.1 V	**04**
	(c)	Write Assembly or C language program to continuously transmit message “Azadi Ka Amrit Mahotsav” serially at 9600 baud rate, 8 bit data and 1 stop bit	**07**

OR

Q.5	**(a)**	Explain SPI signals in brief showing interfacing of SPI device with AVR Microcontroller	**03**
	(b)	What is the difference between SPI and I2C interface? Why I2C is known as two wire interface?	**04**
	(c)	Explain interfacing of 16x2 LCD with AVR Microcontroller. Write assembly or C language program to display message “Azadi Ka Amrit Mahotsav” on the LCD.	**07**

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