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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2019

Subject Code: 2151001 Date: 03/06/2019

Subject Name:Microcontroller and Interfacing

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.**

			MARKS
Q.1	**(a)**	Explain the criteria for selecting a microcontroller.	**03**
	(b)	Describe the status register of AVR microcontroller.	**04**
	(c)	Write short notes on AVR data memory.	**07**
Q.2	**(a)**	Write the difference between IN and LDS instruction of AVR microcontroller	**03**
	(b)	Explain the feature of RISC architecture	**04**
	(c)	Assume that the data memory location 0x315 contains FD(hex). Write an assembly language program to convert it into decimal and save the result into the location 0x322,0x323 and 0x324 where least significant digit store into 0x322.	**07**
		OR	
	(c)	Write an assembly language program to transfer the value 41H serially (one bit at a time) via pin PB1. Put one high at start and end of the data. Send the LSB first.	**07**
Q.3	**(a)**	What is MACRO and how it is used?	**03**
	(b)	Explain the following instruction with example 1. NEG 2. LSL 3. SWAP 4. SBI	**04**
	(c)	Assuming XTAL = 8 MHz write an assembly language program to toggle PB5 once per millisecond.	**07**
		OR	
Q.3	**(a)**	What are assembler directives? Explain any three assembler directives.	**03**
	(b)	Explain the following instruction with example 1. SBIS 2. IJMP 3. RET 4. RCALL	**04**
	(c)	Discuss SPI bus protocol with reference to AVR microcontroller	**07**
Q.4	**(a)**	Write an AVR 'C' program to toggle all bits of port B continuously with a some delay. Use Timer0, normal mode and no prescaler option to generate time delay.	**03**
	(b)	Which are the different timers are available in ATmega32. Explain the times 0 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**
		OR	
Q.4	**(a)**	Write an AVR 'C' program to get a byte of data from port 'C' if it is less than 100 , send it to port B otherwise send it to port D.	**03**
	(b)	Explain the functionality of each bit of TCCR0 and TIFR with necessary diagram.	**04**
	(c)	Explain the connection of ATmega32 with RS232. Write an AVR 'C' program to receive character from the serial port if it is 'a' to 'z' change	**07**

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it to capital letters and transmit it back. Use port A to receive data set baud rate at 9600, 8-bit data and 1 stop bit.

Q.5	**(a)**	Draw and explain DC motor connection using darlington transistor.	**03**
	(b)	Explain the functioning of DDRX, PORTX, and PINX registers with necessary example.	**04**
	(c)	Explain ATmega32 ADC feature and write an AVR 'C' program using interrupt and polling method to convert analog input into digital form. Assume port A as input port and port B and port D as an output port	**07**

OR

Q.5	**(a)**	Explain the different types of stepper motor and its interfacing diagram with AVR microcontroller	**03**
	(b)	Draw the interfacing diagram of keyboard with AVR microcontroller and explain its working.	**04**
	(c)	With neat diagram and appropriate programming example discuss the Interfacing of LCD with AVR microcontroller.	**07**

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