Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(New) • EXAMINATION – WINTER 2016

Subject Code:2151001 **Date:22/11/2016**

Subject Name:Microcontroller and Interfacing

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	True or False: No value can be loaded directly into internal SRAM.	**01**
	2	True or False: Every member of the AVR family regardless of Program ROM size, wakes up at memory location $0000 when it is powered up.	**01**
	3	_____(RCALL, CALL) takes more ROM space.	**01**
	4	EXORing an operand with itself results in _____	**01**
	5	How many LSR instructions are needed to divide a number by 32.	**01**
	6	True or False: We can access the extended I/O register using the I/O direct addressing mode.	**01**
	7	The Instruction LD R19,0x95 uses _____addressing mode.	**01**
	8	Which register is the low byte of x register?	**01**
	9	True or False: The status register of the AVR is bit addressable.	**01**
	10	True or False: The AVR EPROM memory is used for both program and data.	**01**
	11	Give the magnitude of sign char data type.	**01**
	12	To mask certain bits we must AND them with _____	**01**
	13	If we have message string with a size of over 1000 bytes, then we use _____ (Program Rom, Data RAM) to store it.	**01**
	14	How many timers do we have in the ATmega32.	**01**
Q.2	**(a)**	Explain register indirect addressing mode with example.	**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)	Describe the different features of the RISC.	**07**
Q.3	**(a)**	Explain following instruction with example: SBI, SEZ, LDS.	**03**
	(b)	Draw and explain the status register of AVR Microcontroller.	**04**
	(c)	5 Hex numbers are stored in memory. Write a program to convert these numbers in BCD equivalent.	**07**
		OR	
Q.3	**(a)**	Explain following instruction with example: SBIC, TST, ST.	**03**
	(b)	What is Assembler directive? Explain following assembler directive with example. EQU, SET.	**04**

	(c)	Write an assembly language program to generate Fibonacci series for first 10 numbers.	**07**
Q.4	**(a)**	Write down different steps in executing an Interrupt.	**03**
	(b)	Show the instruction to 1. Enable Timer0 overflow interrupt and Timer2 compare match Interrupt. 2. Disable Timer0 overflow interrupt.	**04**
	(c)	Using CTC mode write a program to generate a delay of 8ms. Assume XTAL = 8 MHz.	**07**
		OR	
Q.4	**(a)**	With Fosc =8 MHz, Find the UBRR value needed to have the following baud rates. 1. 9600 2. 4800 3. 2400 4.1200	**03**
	(b)	Draw and explain TCCR0 register in AVR.	**04**
	(c)	Write a program to transmit the message "YES" serially at 9600 baud, 8 bit data and 1 stop bit. Do this forever.	**07**
Q.5	**(a)**	Which are the different features of ADC in AVR?	**03**
	(b)	Draw the interfacing diagram of keyboard with AVR microcontroller and explain its working.	**04**
	(c)	Two strings are given in memory. String s1 = "Hello", String s2 = "World". Write an assembly language program to display string s1 on 1st row of LCD and string s2 on 2nd row of LCD.	**07**
		OR	
Q.5	**(a)**	Explain the criterion need to be considered in choosing the relay.	**03**
	(b)	How does SPI bus protocol work?	**04**
	(c)	A switch is connected to pin PA7(PortA.7). Write a program to monitor the status of the SW and perform the following. 1. If SW = 0, the stepper motor moves clockwise. 2. If SW = 1, the stepper motor moves anti clockwise.	**07**

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