Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2151001 **Date:21/05/2016**

Subject Name:Microcontroller and Interfacing (EC)

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.**

Q.1 **(a)** Identify which register of AVR ATmega32 is responsible to perform following function. **07**

1. To select power management and sleep mode
2. To decide prescaler value for timer
3. To control status of input/output ports
4. Analog Comparator Multiplexer Enable
5. To store result of Analog to Digital conversion
6. To enable timer interrupts
7. To identify status of conditional flag to be used to perform conditional branch

(b) Explain various addressing modes of AVR microcontroller with appropriate example. **07**

Q.2 **(a)** With diagram explain internal architecture of AVR ATmega32 microcontroller. **07**

(b) Discuss 5 sources of reset mechanism for ATmega32 microcontroller and explain reset logic with diagram. **07**

OR

(b) With diagram explain principal clock systems in the AVR microcontroller and their distribution. **07**

Q.3 **(a)** Draw block diagram of 8bit timer/counter and explain its operation. **07**

(b) Explain following instruction with appropriate example. **07**

1. LPM
2. SBRS

OR

Q.3 **(a)** List various sources of AVR interrupts and their priorities. Explain steps in enabling an interrupt. Also discuss external interrupts in detail. **07**

(b) Explain following instruction with appropriate example. **07**

1. MULS
2. STS

Q.4 **(a)** Write a program to generate time delay of 10ms using timer 1 in normal mode. Choose prescaler of 1024. Exclude the instruction overhead due to the instructions in loop. Assume XTAL = 8MHz. **07**

(b) Write an AVR C program to toggle all the pins of Port B continuously. (a) Use the inverting operator. (b) Use the Ex-OR operator. **07**

OR

Q.4 **(a)** Interface 4 LEDs and 1 switch with AVR controller and write a program to demonstrate up/down counter with mod control. **07**

	(b)	Write an AVR program to generate PWM waveform of frequency 31250Hz and duty cycle of 75% using non inverted mode. Assume XTAL = 8MHz.	**07**
Q.5	**(a)**	With diagram explain baud rate generation mechanism for serial communication in AVR microcontroller. Also state mechanism for baud rate error calculation.	**07**
	(b)	Explain stepper motor interfacing with ATmega32 microcontroller with appropriate diagram	**07**

OR

Q.5	**(a)**	With diagram explain LCD interfacing with ATmega32.	**07**
	(b)	State features of ATmega32 ADC and discuss steps in ADC programming.	**07**

****