Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV (NEW) EXAMINATION – WINTER 2020

Subject Code:3141008 Date:17/02/2021

Subject Name:Microprocessor & Microcontroller

Time:02:30 PM TO 04:30 PM Total Marks:56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

MARKS

Q.1 **(a)** Define and compare microprocessors and microcontrollers by listing at least 4 differences between them. **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)** Write an ALP to toggle I/O register of port B continuously forever. **03**

(b) Define addressing mode. Discuss Data Indirect addressing Mode for AVR with proper example. **04**

(c) Discuss SPI bus protocol with reference to AVR microcontroller. **07**

Q.3 **(a)** Define and compare CISC and RISC architecture. **03**

(b) What is assembler directives? List different assembler directives and explain any two with suitable example. **04**

(c) Discuss temperature sensor interfacing with ATmega32 and write an ALP to display temperature on port B. **07**

Q.4 **(a)** Explain the arithmetic shift and logical shift instructions for ATmega32 with suitable example. **03**

(b) Draw the pin diagram of AVR microcontroller and explain the functions of following pins. **04**

1. MISO	2. RESET
3. RXD	4. TCK

(c) Explain following instructions with proper example. **07**

1. LDI	2. ROL	3. LPM	4. ASR
5. SWAP	6. LDD	7. NEG	

Q.5 **(a)** What is the function of status register? Explain and differentiate overflow flag and carry flag in context with AVR. **03**

(b) Draw the pin diagram of 8085 microprocessor and explain the functions of following pins. **04**

1. INTA	2. TRAP
3. HOLD	4. SID

(c) Discuss the steps for execution of branch instruction in AVR. List different branch instructions and explain any two with proper example. **07**

Q.6 **(a)** Draw and explain TCCR0 register for ATMega32. **03**

(b) Explain the functioning of DDRX, PORTX, and PINX registers with appropriate example. **04**

(c) 7 different HEX numbers are stored in memory, write an ALP for AVR microcontroller to convert them in BCD numbers. **07**

Q.7 **(a)** Compare following instructions for AVR microcontroller. **03**

1. TST	2. CPSE
3. SUB	

(b) Write an ALP/Embedded C program to create a square wave of 50% duty cycle on pin PORTB.5. Timer 0 is used to generate the time delay. **04**

(c) With neat diagram and appropriate programming example discuss the interfacing of LCD with AVR microcontroller **07**

Q.8 **(a)** Explain with neat diagram, stepper motor interfacing with AVR. **03**

(b) Write a brief technical note on ADC peripheral of AVR microcontroller. **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**

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