

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 | | | | | | | | |
| <table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <td style="padding: 5px;">1. MISO</td> <td style="padding: 5px;">2. RESET</td> </tr> <tr> <td style="padding: 5px;">3. RXD</td> <td style="padding: 5px;">4. TCK</td> </tr> </table> | 1. MISO | 2. RESET | 3. RXD | 4. TCK | | | | | |
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| (c) Explain following instructions with proper example. | 07 | | | | | | | | |
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| 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 | | | | | | | | |
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- (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**
