

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V EXAMINATION – SUMMER 2025

Subject Code:2151001

Date:09-05-2025

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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1**
- (a) Give difference between Microcontroller and Microprocessor. **03**
 - (b) List selection criteria for Microcontroller for any embedded product. **04**
 - (c) Draw and explain the AVR data memory structure. **07**
- Q.2**
- (a) Explain Macros with suitable example for AVR Microcontroller. **03**
 - (b) List difference between JUMP and CALL instructions. **04**
 - (c) Write an assembly language program to calculate multiplication of two 16 bit numbers stored in memory location 2000H to 2003H. **07**
- OR**
- (c) List and explain addressing modes of AVR with one example. **07**
- Q.3**
- (a) Explain any three bit oriented instructions for AVR microcontroller. **03**
 - (b) Assume that R19 has packed BCD. Write a program to convert the packed BCD to two ASCII numbers and places them in R20 and R21. **04**
 - (c) Write an assembly language program to copy block of 20 bytes of data from data memory locations starting at \$130 to RAM locations starting at \$60. **07**
- OR**
- Q.3**
- (a) Explain memory allocations in C program for AVR Microcontroller. **03**
 - (b) Write an AVR C program to convert FD hex to decimal and display the digits on PORTB, PORTC, and PORTD. **04**
 - (c) Write an assembly language program to add block of 10 bytes of data from data memory locations starting at \$150. **07**
- Q.4**
- (a) Explain difference between interrupts and pulling. **03**
 - (b) Draw control word for TIFR register for Timer 1 in AVR microcontroller. **04**
 - (c) Write a program to generate delay of 25.6 ms. Use Timer 0, CTC mode, XTAL = 8 MHz, and prescaler = 1024. **07**
- OR**
- Q.4**
- (a) Draw the interfacing diagram of keyboard with AVR microcontroller and explain its working. **03**
 - (b) Draw and explain ADC interfacing with AVR microcontroller. **04**
 - (c) Write a program for AVR to transfer the letter “G” serially at 9600 baud, continuously. Use 8-bit data and 1 stop bit. Assume XTAL= 8 MHz. **07**
- Q.5**
- (a) Explain the criterion need to be considered in choosing the relay. **03**
 - (b) Explain interfacing of RTC with AVR microcontroller. **04**
 - (c) Explain stepper motor interfacing with AVR microcontroller. Also write program to rotate it continuously. **07**

OR

- Q.5**
- (a)** Explain I2C bus protocol. **03**
 - (b)** Draw and explain DC motor connection using Darlington transistor with AVR microcontroller. **04**
 - (c)** Draw and explain LCD interfacing with AVR microcontroller. Also write program to display “ Happy New Year” on LCD. **07**
