

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2024****Subject Code:3172001****Date:07-12-2024****Subject Name: Microcontrollers and Embedded Systems****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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Give characteristics of an embedded system also write applications of embedded system. **03**
 (b) Difference between microprocessor and microcontroller. **04**
 (c) Explain basic structure of an embedded system and also explain types of embedded system. **07**

- Q.2** (a) Define checksum byte. How is checksum operation performed? **03**
 (b) Differentiate between interrupts and polling. Explain the types of interrupts in 8051. **04**
 (c) Explain architecture block diagram of 8051. **07**

OR

- (c) Explain the bit configuration of TMOD register. Write steps to program timer 0 in mode 2. **07**

- Q.3** (a) For the microcontroller 8051, write the dual role of Port 3. **03**
 (b) How do you control speed of DC motor using PWM? **04**
 (c) Explain the data framing protocol for asynchronous serial communication in 8051. **07**

OR

- Q.3** (a) Explain RS-232 interfacing to Atmel 8051. **03**
 (b) Write & explain the wave driven sequence for stepper motor control. **04**
 (c) WAP in C to display a count of 0 to 9 on 7-segment display with delay of 0.5seconds. **07**
 XTAL=12MHz.

- Q.4** (a) State the bit manipulation instructions. **03**
 (b) Explain PIC18F4xx Interrupts in brief. **04**
 (c) Interface 7-segment display with PIC18F4xx. **07**

OR

- Q.4** (a) Which are the different serial communication protocols used in Embedded Systems? **03**
 (b) Explain H-bridge concept for DC motor control. **04**
 (c) Draw interfacing diagram of single channel ADC with 8051. Write the conversion routine in C language. **07**

- Q.5** (a) What is current sourcing & current sinking? **03**
 (b) Explain addressing modes of PIC18F4xx with examples. **04**
 (c) Write an Assembly language program to move a memory block of 10 bytes stored at address starting from 0x100 to 0x200. **07**

OR

- Q.5** (a) State & explain any 3 machine control instruction. **03**
 (b) Explain PUSH & POP instructions with suitable example for PIC18F4xx stack. **04**
 (c) For PIC18F4xx microcontroller, draw internal structure of PORT B and explain all the pins. **07**
