Seat No.: _____ Enrolment No._____ 



# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2020**

**Subject Code:3151707 Date:29/01/2021**

**Subject Name:Microcontroller and Interfacing**

**Time:10:30 AM TO 12:30 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)** | Which bits of PSW are responsible for selection of banks? By default which bank gets selected? And show how to select the bank 2 with instruction after power up. | **03** |
| | **(b)** | Draw circuit diagram of XTAL connection and power on RESET circuits for the 8051 microcontroller. | **04** |
| | **(c)** | Write an 8051 assembly language program to generate a square wave of 100kHz, 50% duty cycle on the P1.7 pin using timer 1 in mode1. Show your delay calculations assuming crystal frequency of 22MHz. | **07** |
| **Q.2** | **(a)** | Show the interfacing of eight keys with Port 0 to read inputs in Micro-controller 8051. | **03** |
| | **(b)** | Write the pros and cons for Microcontroller programming in C language. | **04** |
| | **(c)** | How the Timer 0 and 1 are started and stopped by instructions. Show the delay calculations for generating a square wave of frequency 2 KHz using Timer of MC on any pin using Mode 1 assuming crystal frequency of 12 MHz. | **07** |
| **Q.3** | **(a)** | Write the structure of TMOD and explain Modes in brief. | **03** |
| | **(b)** | Write the steps required to program 8051 to transfer data serially. | **04** |
| | **(c)** | Connect a switch to INT0 interrupt pin and LED to P1.3 of MC 8051. Write an assembly language program to toggle LED when switch is not pressed. Stop the toggling and put LED in ON status if switch is pressed. Keep this continuously. Make use of interrupt in your program. (No credit will be given without interrupt). | **07** |
| **Q.4** | **(a)** | With suitable diagram and explanation show the working Timer/Counter if GATE bit is set to 1 in TMOD Register. | **03** |
| | **(b)** | Write the steps required to program 8051 to receive data serially. | **04** |
| | **(c)** | Explain Interrupt vs. Polling. Also describe the steps in executing an interrupt. List out the interrupts Micro-controller 8051 with its vector locations. | **07** |
| **Q.5** | **(a)** | Write the factors affecting the accuracy of generation of delay in micro-controller. | **03** |
| | **(b)** | Draw the timing diagram of performing ADC conversion by ADC0804. | **04** |
| | **(c)** | Describe the various addressing modes for accessing memory in 8051 Micro-controller. | **07** |

| | | | |
|---|---|---|---|
| Q.6 | (a) | Write the function executed by LCD, when following commands are given to LCD. 1)01H 2) 0CH 3) 38H | 03 |
| | (b) | Give the summary of various data types with their data range used in C language. | 04 |
| | (c) | Show the diagram interfacing DAC0808 with MC 8051. What will be output amplitude from DAC, if input digital number applied is FFH from MC. | 07 |
| Q.7 | (a) | Draw the connections with 8051 micro-controller to build any application. | 03 |
| | (b) | Explain ADDC and DIV instructions with example. | 04 |
| | (c) | Draw interfacing diagram of 4X4 Matrix key board with 8051 and write an assembly language program to display which key is pressed on seven segment display. | 07 |
| Q.8 | (a) | Explain PUSH and POP instruction | 03 |
| | (b) | Explain Four directives of 8051- ORG, END DB, EQU | 04 |
| | (c) | Draw diagram to interface six lead stepper motor with 8051 with driver and Write an Assembly language program to rotate stepper motor continue in clock wise direction in four step mode. | 07 |