

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2024****Subject Code:3152409****Date:17-12-2024****Subject Name:Microcontrollers Architecture, Interefacing and Applications****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.

|            |                                                                                           | <b>MARKS</b> |
|------------|-------------------------------------------------------------------------------------------|--------------|
| <b>Q.1</b> | (a) Define ALU and state its importance.                                                  | <b>03</b>    |
|            | (b) Explain 1x4 De-multiplexer with neat diagram.                                         | <b>04</b>    |
|            | (c) Explain importance of PSW register with its each bit significance.                    | <b>07</b>    |
| <b>Q.2</b> | (a) What is function of stack pointer (SP)?                                               | <b>03</b>    |
|            | (b) Define the terms: address bus, data bus and control bus.                              | <b>04</b>    |
|            | (c) Explain 2 to 4 decoder with its truth table and diagram.                              | <b>07</b>    |
|            | <b>OR</b>                                                                                 |              |
|            | (c) Write a brief note on Internal memory organization of 8051.                           | <b>07</b>    |
| <b>Q.3</b> | (a) Explain difference between ADD and ADDC instructions.                                 | <b>03</b>    |
|            | (b) Explain any two assembler directives for 8051 microcontroller.                        | <b>04</b>    |
|            | (c) Explain following addressing modes of 8051 microcontroller with suitable example.     | <b>07</b>    |
|            | (1) Immediate Addressing mode.                                                            |              |
|            | (2) Register Addressing mode.                                                             |              |
|            | <b>OR</b>                                                                                 |              |
| <b>Q.3</b> | (a) What is the use of I/O ports in 8051 microcontroller?                                 | <b>03</b>    |
|            | (b) Why delay are required in programming? Explain.                                       | <b>04</b>    |
|            | (c) Explain execution of following jump instruction in reference to 8051 microcontroller. | <b>07</b>    |
|            | (1) JZ                                                                                    |              |
|            | (2) ZNC                                                                                   |              |
| <b>Q.4</b> | (a) Define bits of TMOD register.                                                         | <b>03</b>    |
|            | (b) What is function of Arithmetic Logic Unit (ALU) in microcontroller 8051?              | <b>04</b>    |
|            | (c) Write a short note on Interrupts used in 8051 microcontroller.                        | <b>07</b>    |
|            | <b>OR</b>                                                                                 |              |
| <b>Q.4</b> | (a) Explain function of stack in brief.                                                   | <b>03</b>    |
|            | (b) Explain 8051 timer operation in mode-2.                                               | <b>04</b>    |
|            | (c) Explain keyboard interfacing with 8051 microcontroller.                               | <b>07</b>    |
| <b>Q.5</b> | (a) What is serial communication? Explain.                                                | <b>03</b>    |
|            | (b) What is interfacing in 8051 microcontroller? Explain.                                 | <b>04</b>    |
|            | (c) Write a short note on PWM control of DC motor using 8051 microcontroller.             | <b>07</b>    |
|            | <b>OR</b>                                                                                 |              |
| <b>Q.5</b> | (a) What is Flip Flop? Explain.                                                           | <b>03</b>    |
|            | (b) Draw the block diagram of microcontroller 8051.                                       | <b>04</b>    |
|            | (c) Write a C language program to create square wave of any frequency at any port pin.    | <b>07</b>    |

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