

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2023****Subject Code:3152409****Date:20-12-2023****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.

		MARKS
<b>Q.1</b>	(a) With neat diagram explain PSW register.	<b>03</b>
	(b) Draw the block diagram of microcontroller 8051.	<b>04</b>
	(c) Explain importance of PSW register with its each bit significance.	<b>07</b>
<b>Q.2</b>	(a) Define bits of SCON & TCON registers.	<b>03</b>
	(b) Define the terms: address bus, data bus and control bus.	<b>04</b>
	(c) Explain SFR (Special Function Register) and PSW (Program Status Word).	<b>07</b>
<b>OR</b>		
	(c) Write a program to generate a control signal on P 0.5 to operate a buck converter at 1kHz with 25% duty cycle. Assume crystal frequency of 12MHz.	<b>07</b>
<b>Q.3</b>	(a) State important criterion for the selection of microcontroller.	<b>03</b>
	(b) Explain difference between ADD and ADDC instructions.	<b>04</b>
	(c) Write a program to generate an output as a square wave with a frequency of 5 Hz at P2.2 pin of 8051. Assume that the crystal frequency is 12MHz.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Give comparison of microcontroller and microprocessor.	<b>03</b>
	(b) Explain MUL instruction with example.	<b>04</b>
	(c) Write a program to Toggle all the LEDs ON and OFF (Blinking LEDs) with a frequency of 10 Hz that are connected to PORT 01 of the 8051 Microcontroller. Take crystal frequency of 12 Mhz.	<b>07</b>
<b>Q.4</b>	(a) What is the function of interrupts in 8051? List various interrupts available in 8051.	<b>03</b>
	(b) Why delay are required in programming?	<b>04</b>
	(c) Explain different addressing modes of 8051 with example.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) What do you mean by stack? Explain in brief w.r.t 8051.	<b>03</b>
	(b) Write a brief note on DAC.	<b>04</b>
	(c) Draw internal block diagram of 8051. State 8051 pins used while interfacing with external program memory.	<b>07</b>
<b>Q.5</b>	(a) What is assembler directive? State any 3 assembler directives.	<b>03</b>
	(b) State the similarities and differences between following instructions. ADD A, R1 and ADD A, @R1	<b>04</b>
	(c) State various types of Jump and Loop instructions. Explain any three with examples.	<b>07</b>
<b>OR</b>		
<b>Q.5</b>	(a) Draw schematic diagram of 4 to 1 multiplexer.	<b>03</b>
	(b) Explain any two arithmetic instruction of 8051.	<b>04</b>
	(c) Draw internal architecture of 8051 microcontroller. Discuss function of each block in detail.	<b>07</b>

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