QP Code: R264A030 | Reg. No | | | | | | | | | | | AY 23

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fourth Semester - Regular) Examinations, April 2026

23BVTPC24001 –Microcontroller and Computer Architecture
(EE (VLSI))

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right-hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions		CO #	Blooms Level
a.	Explain the functional operation of 8085 microprocessor during instruction execution.	CO1	K2
b.	What is the use of ALE pin in 8051?	CO2	K1
c.	If an ARM microcontroller has a 32-bit address bus, calculate the maximum addressable memory space.	CO3	K3
d.	Why do we put a driver in between the microcontroller and the stepper motor?	CO4	K2
e.	What is the use of DPTR register? Give at least two examples.	CO2	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	With the help of a block diagram, describe the internal architecture of the 8085 microprocessor and explain the functional operation of its ALU, registers and timing control unit.	5	CO1	K2
b.	Discuss the role of registers and memory organization in ARM.	5	CO5	K2
	(OR)			
c.	Draw a neat and labelled block diagram of the 8051 microcontrollers. Explain the function of the ALU, Accumulator, and Program Counter in detail.	4	CO2	K2
d.	The crystal frequency connected to an 8051 microcontroller is 12 MHz. Calculate: i. The oscillator period ii. The machine cycle time iii. The time required to execute an instruction that takes 2 machine cycles.	6	CO3	K3
3.a.	Draw and explain the architecture of 8051 microcontroller with a neat block diagram. Describe the function of each internal block.	5	CO2	K2
b.	Explain the addressing modes of ARM with suitable examples.	5	CO5	K2
	(OR)			
c.	Explain the bus organization of a microprocessor system with a neat diagram.	4	CO1	K2
d.	Draw the interfacing of a 4×4 matrix keypad with the 8051 microcontroller. From the figure, identify the row and column of the pressed key for each of the following: i. D3-D0 = 1110 for the row, D3-DO = 1011 for the column. ii. D3-D0 = 1101 for the row, D3-DO = 0111 for the column.	6	CO4	K3
4.a.	Explain the register organization of 8085 microprocessor with a neat diagram.	4	CO1	K2
b.	Explain the interfacing of a stepper motor with the 8051 microcontrollers.	6	CO4	K2

	Discuss its basic construction, and working principle.			
	(OR)			
c.	Discuss the Interrupt Enable (IE) register of 8051 in detail. Explain how interrupts are enabled and disabled in the microcontroller.	4	CO2	K2
d.	Write an 8051-assembly language program to add two 8-bit numbers stored in RAM locations 30H and 31H and store the result in 32H. Explain the program with steps and mention the effect on flags.	6	CO3	K3
5.a.	Discuss the working of ARM data processing instructions such as MOV, MVN, ADD, SUB, ADC, and SBC with examples.	5	CO5	K2
b.	Describe the 128-byte internal RAM organization of the 8051.	5	CO2	K2
	(OR)			
c.	What are SFRs? Discuss the bit-structure and function of the PSW (Program Status Word).	5	CO2	K2
d.	Explain with example the various addressing modes of 8051.	5	CO3	K2
6.a.	Draw the pin diagram of 8051 microcontroller and explain the function of each important pin.	5	CO2	K2
b.	Explore the interfacing with ADC804 chip and explain its pin.	5	CO4	K2
	(OR)			
c.	Explain the addressing modes of 8085 microprocessor in detail with suitable examples of instructions for each mode.	4	CO1	K2
d.	Explain timers, interrupts, and GPIO ports in ARM microcontrollers.	6	CO5	K2

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