

<b>Reg. No.</b>																			
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<b>Question Paper Code</b>	<b>14023</b>
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025**

Fifth Semester

**Electronics and Instrumentation Engineering**

(Common to Instrumentation and Control Engineering)

**20EIPC502 – MICROPROCESSOR AND MICROCONTROLLERS**

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

**PART - A (MCQ) (10 × 1 = 10 Marks)**

Answer ALL Questions

	<i>Marks</i>	<i>K – Level</i>	<i>CO</i>
1. 8085 is a -----bit Microprocessor. a) 16 bit                      b) 8 bit                      c) 32 bit                      d) 64 bit	1	K1	CO1
2. Calculate the time taken for executing the instruction MVI A,#10 if the operating frequency is 3 MHz: a) 2.3 Microseconds                      b) 1.3 Microseconds c) 3.3 Microseconds                      d) 4.3 Microseconds	1	K2	CO1
3. When the microcontroller executes some arithmetic operations, then the flag bits of which register are affected? a) PSW                      b) SP                      c) DPTR                      d) PC	1	K1	CO2
4. On power up, the 8051 uses which RAM locations for register R0- R7: a) 00-2F                      b) 00-07                      c) 00-7F                      d) 00-0F	1	K1	CO2
5. In the I/O mode, the 8255 ports work as a) reset pins      b) set pins      c) programmable I/O ports      d) only output ports	1	K1	CO3
6. The sensor RAM acts as 8-byte first-in-first-out RAM in: a) keyboard mode                      b) strobed input mode c) keyboard and strobed input mode                      d) scanned sensor matrix mode	1	K1	CO3
7. Calculate the step angle of a permanent-magnet stepper motor having 8 stator poles and 4 rotor poles? a) 60°                      b) 45°                      c) 30°                      d) 15°	1	K2	CO4
8. The type of control signal used to drive a servo motor is: a) DC voltage                      b) Sinusoidal waveform c) PWM                      d) Square wave at constant duty cycle	1	K1	CO4
9. In a RISC architecture, most instructions are executed in: a) Multiple cycles                      b) Single clock cycle c) Two cycles                      d) Depends on the instruction	1	K1	CO5
10. Which of the following architectures is typically CISC? a) ARM                      b) MIPS                      c) Intel x86                      d) AVR	1	K1	CO5

**PART - B (12 × 2 = 24 Marks)**

Answer ALL Questions

11. Explain about SID and SOD instruction in 8085 microprocessor.	2	K2	CO1
12. Explain the functions of ALU and IO/M signals in the 8085 architecture.	2	K2	CO1
13. Explain the flags of Program Status Word register in 8051 microcontroller.	2	K2	CO2
14. Deduce the applications of 8051 microcontroller.	2	K2	CO2
15. State the important features of 8255 IC.	2	K1	CO3
16. Illustrate about the functions of scanning lines and return lines of 8279 IC.	2	K2	CO3
17. How is pulse generated from microcontroller for stepper motor control?	2	K2	CO4
18. Derive the control word format for 8254 timer IC.	2	K2	CO4

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|-----|---|---|----|-----|
| 19. | Compare RISC and CISC design philosophy.                                  | 2 | K2 | CO5 |
| 20. | Give some examples for 32 bit and 64 bit microprocessor.                  | 2 | K1 | CO5 |
| 21. | Explain about the interrupt structure of 8085 microcontroller.            | 2 | K2 | CO1 |
| 22. | Illustrate the alternate functions of port 3 in the 8051 microcontroller. | 2 | K2 | CO2 |

**PART - C (6 × 11 = 66 Marks)**

Answer ALL Questions

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|-----------|---|----|----|-----|
| 23.       | a) Analyze the role of each functional block in the 8085 architecture and explain how they interact during instruction execution.   | 11 | K4 | CO1 |
| <b>OR</b> |   |    |    |     |
|           | b) Draw the timing diagram for the instruction <b>STA 4200 H</b> and explain the steps involved in the construction. Calculate the execution time of the instruction.   | 11 | K4 | CO1 |
| 24.       | a) Develop an assembly program to multiply an 8-bit number with a 16-bit number using 8051 instructions. Analyze how the multiplication is carried out stepwise and how results are stored in registers or memory.                    | 11 | K4 | CO2 |
| <b>OR</b> |   |    |    |     |
|           | b) Analyze how interrupts are prioritized using 8051 microcontroller and develop an assembly language code for processing an interrupt for any practical example.   | 11 | K4 | CO2 |
| 25.       | a) Explain the architecture of the 8255 Programmable Peripheral Interface (PPI) with a neat block diagram. Analyze how peripheral devices are interfaced with a proper interfacing circuit.   | 11 | K4 | CO3 |
| <b>OR</b> |   |    |    |     |
|           | b) Explain the architecture of the 8279 Keyboard and Display Interface (PPI) with a neat block diagram. Construct an assembly language program to display a message "HELLO" .   | 11 | K4 | CO3 |
| 26.       | a) Design and illustrate a block diagram for interfacing a stepper motor with an 8051 microcontroller. Additionally, provide an assembly language program to control the direction of rotation of a stepper motor through this setup. | 11 | K4 | CO4 |
| <b>OR</b> |   |    |    |     |
|           | b) Design an interfacing circuit for connecting a Digital to Analog Converter using 8051 Microcontroller and develop assembly language code to generate waveforms.  | 11 | K4 | CO4 |
| 27.       | a) Compare the features of 16 bit microprocessor and 32 bit microprocessor architecture and illustrate their advantages.  | 11 | K3 | CO5 |
| <b>OR</b> |   |    |    |     |
|           | b) Explain the embedded system design and CPU module for a practical application.   | 11 | K3 | CO5 |
| 28.       | a) Analyze the role of memory banks in the 8051 architecture and explain how to address them during execution of a program.   | 11 | K3 | CO2 |
| <b>OR</b> |   |    |    |     |
|           | b) Analyze the data manipulation and data transfer instructions with an example along with their flag status.   | 11 | K3 | CO2 |