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Question Paper Code	14036
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B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Third Semester

Computer Science and Engineering (IoT)

20CIPC301 – COMPUTER ARCHITECTURE 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. What was the initial method of programming used for the first computers? (a) Assembly Language (b) Machine language (c) Source Code(d) Object code	1	K1	CO1
2. Who developed the basic architecture of the computer? (a) Blaise Pascal (b)Charles Babbage (c)John Von Neumann (d)Edison	1	K1	CO1
3. In the IEEE 754 single-precision format, what is the exponent bias used for floating-point numbers? (a)125 (b)127 (c)456 (d)321	1	K1	CO2
4. In a floating-point multiplication operation, if the result of multiplying two normalized numbers exceeds the largest representable exponent, what is this condition called? (a) Overflow (b) Rounding error (c) Underflow (d) Precision loss	1	K1	CO2
5. Which of the following is a characteristic of a Harvard architecture CPU? (a) Single shared memory for instructions and data (b) Separate memory spaces for instructions and data (c) High susceptibility to memory interference (d) Reduced program execution speed	1	K1	CO3
6. An exception is an _____ event that disrupts the normal flow of program execution. (a) expected (b) routine (c) predictable (d) unusual	1	K1	CO3
7. _____ are used to connect to input-output ports. (a) Peripheral devices (b) Memory devices (c) Timer circuits (d) Logical circuits	1	K1	CO4
8. Name the register that holds the address of the next instruction to be executed (a) Flag Register (b) Instruction Register (c) Program Counter (d) General Purpose Register	1	K1	CO4
9. Which of the following special-purpose registers is used for serial communication? (a)TCON(b) SCON (c) PCON(d) TBUF	1	K1	CO5
10. In the 8051 microcontroller _____ will act as standard UART mode. (a)Mode 1(b) Mode 0 (c) Mode 2 (d) Mode 3	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11. Define Computer Architecture.	2	K1	CO1
12. Write down the performance equation of a system.	2	K1	CO1
13. How does the PC get altered during the execution of a branch instruction?	2	K1	CO2
14. Write the overflow conditions for addition and subtraction.	2	K1	CO2
15. Differentiate between Asserted and Deasserted Signal.	2	K2	CO3
16. State the use of the program counter.	2	K1	CO3
17. List the use of the stack pointer (sp).	2	K1	CO4

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| 18. Write an ALP to find the square root of a number and store it in R0. | 2 | K1 | CO4 |
| 19. What is a serial data buffer? | 2 | K1 | CO5 |
| 20. Give an application for synchronous serial communication. | 2 | K1 | CO5 |
| 21. How the interrupts are handled in the 8051? | 2 | K1 | CO6 |
| 22. Define Baud Rate. | 2 | K1 | CO6 |

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

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| 23. a) Explain how performance is calculated in a computer system and derive the necessary equations. | 11 | K2 | CO1 |
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| b) Consider three different processors, P1, P2, and P3, executing the same instruction set. P1 has a 3 GHz clock rate and a CPI of 1.5. P2 has a 2.5 GHz clock rate and a CPI of 1.0. P3 has a 4.0 GHz clock rate and a CPI of 2.2.
(i) Which processor has the highest performance expressed in instructions per second?
(ii) If each processor executes a program in 10 seconds, find the number of cycles and the number of instructions. | 11 | K2 | CO1 |
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| 24. a) Explain the number system concepts and also represent -307.1875 in IEEE single precision and double precision formats. | 11 | K2 | CO2 |
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| b) Explain in detail about floating point addition with a neat block diagram and flow chart. | 11 | K2 | CO2 |
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| 25. a) Explain the process of building a single data path with a neat diagram. | 11 | K2 | CO3 |
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| b) Explain Data Hazards and Stalls with neat diagrams and suitable examples. | 11 | K2 | CO3 |
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| 26. a) Draw and Explain the Memory Organization of the 8051 Microcontroller. | 11 | K2 | CO4 |
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| b) Discuss the organization of the Internal RAM and Special Function Registers of the 8051 Microcontroller in detail. | 11 | K2 | CO4 |
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| 27. a) Explain in detail the Modes of Operation of the Timer unit in the 8051 microcontroller. | 11 | K2 | CO5 |
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| b) Sketch the Pin Configuration of Port 1 and also explain the various operations performed by the pins of port 1. | 11 | K2 | CO5 |
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| 28. a) Interface a 4x4 key keyboard to 8051 and write an ALP to send the key code to port P1 whenever a key is pressed. | 11 | K2 | CO6 |
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| b) Explain the necessary hardware & software details and how to interface the LCD with the 8051. | 11 | K2 | CO6 |
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