Reg. No.															

Question Paper Code	13640

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 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

		Marks	K – Level	CO
1.	What is the main function of the Central Processing Unit (CPU) in a computer system? (a) Storing data (b) Processing instructions (c) Displaying information (d) Printing documents	1	K1	CO1
2.	What type of operation is the LW (load word) instruction in MIPS? (a) Arithmetic operation (b) Logical operation (c) Data transfer operation (d) Control operation	1	K1	CO1
3.	In IEEE 754 single-precision format, what is the exponent bias used for floating-point numbers? (a) 125 (b) 127 (c) 56 (d) 321	1	K1	CO2
4.	In floating-point arithmetic, what does the term "mantissa" represent? (a) The exponent (b) The sign bit (c) The integer part (d) The fractional part	1	K1	CO2
5.	The control unit (CU) communicates with other components of the CPU using: (a) Data bus (b) Control signals (c) Address bus (d) Cache memory	1	K1	CO3
6.	Which register holds the address of the next instruction to be executed? (a) Program Counter (PC) (b) Instruction Register (IR) (c) Accumulator (AC) (d) Stack Pointer (SP)	1	K1	CO3
7.	The 8051 microcontroller is an ____ bit microcontroller. (a) 4 (b) 8 (c) 16 (d) 32	1	K1	CO4
8.	_____ are used to connect to input-output ports. (a) Peripheral devices (b) Memory devices (c) Timer circuits (d) Logical circuits	1	K1	CO4
9.	The 8051 microcontroller has how many I/O ports? (a) 2 (b) 3 (c) 4 (d) 5	1	K1	CO5
10.	Which 8051 port is commonly used for interfacing with external memory? (a) Port 0 (b) Port 1 (c) Port 2 (d) Port 3	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Tabulate the components of computer system.	2	K2	CO1
12.	Give the addressing modes in MIPS.	2	K1	CO1
13.	Define overflow and underflow with examples.	2	K1	CO2
14.	State sub-word parallelism.	2	K1	CO2
15.	Express the control signals required to perform arithmetic operations.	2	K2	CO3
16.	List the types of hazards.	2	K1	CO3
17.	Mention the applications of microcontrollers in everyday life.	2	K2	CO4
18.	Draw the flag register of 8051.	2	K1	CO4
19.	List the importance of I/O port in a Microcontroller.	2	K1	CO5
20.	What is a serial data buffer?	2	K1	CO5

21.	Define ISR.		2	K1	CO6
22.	Define interrupt.		2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	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. Q1. Which processor has the highest performance expressed in instructions per second? Q2. If the processors each execute a program in 10 seconds, find the number of cycles and the number of instructions.	11	K2	CO1
		OR			
	b)	Explain how performance is calculated in computer system and derive necessary equations.	11	K2	CO1
24.	a)	Multiply 1010 * 1110 using sequential multiplication algorithm and explain each step.	11	K2	CO2
		OR			
	b)	Illustrate the single and double precision format for -307.1875 $_{10.}$	11	K2	CO2
25.	a)	Discuss the basic MIPS implementation of instruction set.	11	K2	CO3
		OR			
	b)	Illustrate the data forwarding method to avoid data hazards.	11	K2	CO3
26.	a)	With the help of a neat block diagram, Explain the internal architecture of 8051 microcontroller in detail.	11	K2	CO4
		OR			
	b)	Write an assembly program of 8051 to multiply two 8-bit numbers and store the result in a memory location.	11	K2	CO4
27.	a)	Discuss the operation of timers present in 8051.	11	K2	CO5
		OR			
	b)	Explain in detail how the 8051 transfers the data using serial port.	11	K2	CO5
28.	a)	Describe with a schematic, the scanning of the 4x4 matrix keyboard in an 8051 based system and identifying the key pressed.	11	K2	CO6
		OR			
	b)	With the help of a neat diagram show the interfacing of LCD Display with 8051 and explain its operation.	11	K2	CO6