



**2023/TDC(CBCS)/EVEN/SEM/
CSCHCC-201T/319**

TDC (CBCS) Even Semester Exam., 2023

**COMPUTER SCIENCE
(Honours)**

(2nd Semester)

Course No. : CSCHCC-201T

(Computer System Architecture)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

SECTION—A

Answer any *ten* of the following questions : $2 \times 10 = 20$

1. What is underflow in floating-point arithmetic?
2. Considering memory hierarchy, define hit and miss.
3. State the purpose of the following registers in processor architectures :
PC, MDR, IR and MAR
4. What are the rules to perform addition on floating-point numbers?



5. Define processor clock.
6. What is meant by an instruction cycle?
7. Define interrupt and interrupt service routine.
8. What are four types of operations performed by computer instructions?
9. What does memory hierarchy mean?
10. What is TLB (Translation Lookaside Buffer)?
11. What is an addressing mode?
12. Write the 2's complement of 1011011.
13. Design and draw the logic diagram of full-adder.
14. Define DMA controller.
15. Why are NAND and NOR gates more popular?

SECTION—B

Answer any *five* of the following questions.: $10 \times 5 = 50$

16. (a) Implement AND gate using only NOR gate. 2
- (b) State the principle of duality. 2
- (c) Realize *J-K* flip-flop using *D* flip-flop. 3
- (d) Minimize the following function using K-map : 3

$$F = \sum m(1, 2, 3, 5, 6, 7)$$

17. (a) What is a prime implicant? 2
- (b) Express $x + yz$ as the sum of minterms. 3
- (c) Implement a full-adder with 4×1 multiplexer. 3
- (d) How many states are there in 3-bit ring counter? What are they? 2
18. (a) Convert $(0.513)_{10}$ to octal, convert $(673.124)_8$ to hexa decimal. 3
- (b) Consider a 7-bit floating-point representation with 3 bits for the excess-3 exponent and 3 bits for the mantissa.
 - (i) How would $0.375(10)$ be represented in this 7-bit representation?
 - (ii) What decimal value does 0110110 represent? 4
- (c) Explain the various representation types of signed binary numbers. 3
19. (a) Perform binary addition using 1's complement for two binary numbers -0110 and -0111. 3
- (b) What is floating-point representation? What are the types of floating-point representation? 4
- (c) What is fixed-point representation of negative number? 3



20. (a) What is Bus? Draw the single-bus structure. 3
(b) Draw the flow of instruction cycle. 3
(c) Explain instruction set architecture. Give example. 4
21. (a) What is memory reference instruction? Explain with example. 5
(b) Explain the different classes of CPU registers. 5
22. (a) Briefly describe the hardware organization of associative memory. Also, discuss the read and write operation for the associative memory. 5
(b) Write a short note on RISC architecture. 5
23. (a) Explain the significance of cache memory in computer system. 5
(b) What is meant by addressing mode? Explain absolute and indirect addressing modes with suitable examples. 5
24. (a) Explain with the block diagram the DMA transfer in a computer system. 5
(b) Explain interrupt-driven I/O technique. 5
25. (a) Explain various data transfer modes used in DMA. 5
(b) What is an I/O module? Discuss with the help of a diagram, the functioning of I/O module. 5

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