K25U 0975

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (C.B.C.S.S. – OBE-Regular)
Examination, April 2025
(2023 Admissions)
CORE COURSE IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
4B05AIML : Digital Fundamentals and Computer Organization

Time : 3 Hours Max. Marks : 40

PART – A
(Short Answer)

Answer **all** questions. **Each** question carries **1** mark.

1. What is the Idempotent Law in Boolean algebra ?
2. Define the terms literal and complement in Boolean expressions.
3. What is the difference between combinational and sequential circuits ?
4. Name two types of counters and their uses.
5. What is an instruction cycle in a processor ?
6. Define cache coherence in memory systems. **(6×1=6)**

PART – B
(Short Essay)

Answer **any six** questions. **Each** question carries **2** marks.

7. Explain the commutative and distributive properties in Boolean algebra with examples.
8. What are the differences between a decoder and a demultiplexer ?
9. Describe the functionality of a D flip-flop with a truth table.
10. Compare synchronous and asynchronous sequential circuits.
11. Explain the classification of Instruction Set Architectures (ISA).

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12. What are data hazards in pipelining, and how can they be minimized ?
13. How does interrupt priority handling work in computer systems ?
14. Explain the role of cache memory in improving processor performance. **(6×2=12)**

PART – C
(Essay)

Answer **any four** questions. **Each** question carries 3 marks.

15. Discuss the importance of Boolean function minimization and demonstrate simplification of Boolean function using any method.
16. Explain the different types of shift registers and their applications.
17. What are the different types of addressing modes in instruction execution ? Provide examples.
18. Describe the working of a simple data path in a CPU with a diagram.
19. What is Direct Memory Access (DMA), and how does it improve CPU efficiency ?
20. Explain the differences between write-through and write-back cache policies. **(4×3=12)**

PART – D
(Long Essay)

Answer **any two** questions. **Each** question carries **5** marks.

21. Explain the working and applications of adders and subtractors in digital circuits.
22. Discuss the five key components of a computer system and their interactions.
23. What are control hazards in pipelining ? Explain methods to handle them.
24. Describe the different types of memory hierarchy and their impact on system performance. **(2×5=10)**