Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category 'A' by MHRD (now MoE)
Re-accredited with 'A++' Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Arrear Examination – May 2025
I Semester

Batch : 2022 Arrear | **Time: 3 Hours**
Major : Computer Applications | **Max. Marks: 100**

21BCAC01 Digital Principles

PART A **10 x 1 = 10**
Choose the Correct Answer

Courseoutcomes:

1. Explorethebasiccomponentsofadigitalcomputerandtheirfunctions.
2. Acquireknowledgeonsimplifyingdigitalcircuits.
3. ApplyBooleanalgebraingatingnetworkdesign.
4. Simplifyandsolvethelogicalexpressions.
5. Designvariouscountersand understandtheconstructionofmemory.

Part A **10 x1 =10**
ChoosetheCorrect Answer

1. Convertthefollowingdecimalnumberto8-bit binary.45_{10} CO1K1
   a.00101101_2 b.00110101_2
   c. 00101110_2 d.00101100_2

2. Convertthefollowingbinarynumbertodecimal.001010_2 CO1K1
   a.8 b.10
   c.12 d. 5

3. What does the bar symbol ($\bar{}$) represent in Boolean algebra? CO2K2
   a.OR operation b.NORoperation
   c.AND operation d.NOT operation

4.Afulladderconsists of CO2K2
   a.twohalfadders b.two halfaddersand aORgate
   c.twohalfadders andaNOTgate d.threehalfadders

5. What is the primary function of a multiplexer? CO3K1
   a. To select one input from multiple inputs
   b. To amplify signals
   c. To store data
   d. To generate clock signals

6. Which of the following Boolean expressions is in Product-of-Sums (POS) form? CO3K1
   a. $(A+B)(C+D)$ b.$(AB)(CD)$
   c.$AB(CD)$ d. $AB+ CD$

7. Which of the following is an example of a multiplexer? CO4K2
   a. 4-to-1 MUX b. 1-to-4 DEMUX
   c. Flip-Flop d. Counter

8. What happens when both J and K inputs of a J-K flip-flop are set to 1? CO4K1
   a. No change in output b. Output toggles
   c. Output resets to 0 d. Output sets to 1

9. Which type of memory is commonly used as the main memory in computers? CO5K2
   a. Static RAM (SRAM) b. Dynamic RAM (DRAM)
   c. Read-Only Memory (ROM) d. Flash Memory

10. What is the main purpose of cache memory? CO5K1
   a. To store data permanently
   b. To increase processing speed by storing frequently used data
   c. To replace RAM in a computer
   d. To slow down the CPU

Part B — 5 x6 =30

Answer ALL questions

Each answer should not exceed 400 words or two pages

11.a. Explain the Binary Code system with appropriate examples. CO1K2

(or)

11.b. Explain Error Detecting and Correcting Codes briefly. CO2K1

12.a. What are the laws and rules of Boolean algebra? List and explain them. CO2K1

(or)

12.b. What is a Half Adder? Explain its functionality with a diagram and truth table CO2K2

13.a. Write a comprehensive short note on Multiplexer and Demultiplexer, highlighting their uses and working principles. CO3K4

(or)

13.b. Explain Programmable Logic Array and its characteristics in detail. CO3K4

14.a. How does an RS Flip-Flop work? Explain with a detailed analysis and truth table. CO4K3

(or)

14.b. What are the applications of Shift Registers? Explain in detail. CO4K4

15.a. Describe the working of a Ring Counter and its significance in digital circuits. CO5K2

(or)

15.b. Describe Memory Addressing with examples. CO5K2

Part C — 5 x 12 =60

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. Explain the following conversions with examples:
i. Decimal to Binary conversion ii. Decimal to Octal conversion CO1K1

(or)

16.b. Give a detailed summary of Logic Gates along with their truth tables and functions.. CO1K2

17.a. How can Boolean expressions be simplified using the Karnaugh Map (K-Map) method? Explain with a truth table and examples. CO2K1

(or)

17.b. Explain the different types of Universal Gates with their truth tables. CO2K2

18.a. Explain Encoders and Decoders in detail with a diagram. CO3K2

(or)

18.b. What are the uses of a Parity Generator and Parity Checker? Explain their working principles with the help of a diagram. CO3K4

19.a. Explain in detail the following topics:
i. Master-Slave Flip-Flops
ii. JK Flip-Flops, including their working principles and applications. CO4K2

(or)

19.b. Provide a detailed explanation of the different types of Shift Registers with examples. CO4K2

20.a. Explain the concepts of Up-Down counters and Synchronous counters. CO5K2

(or)

20.b. Explain the various types of RAM and ROM, highlighting their characteristics and uses. CO5K2

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