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BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – Dip.CSE-2022/Dip.CSE-2023
Course Name – Digital Electronics
Course Code - DCSE-PC302
(Semester III)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select the other name of NOT gate from the following.
a) Derived Gate b) Universal Gate
c) Inverter d) None of these

(ii) State the IC number for NAND gate from the following.
a) 7486 b) 7400
c) 7432 d) 7402

(iii) Select the number of outputs of a Full Adder.
a) 2 b) 1
c) 3 d) 4

(iv) Identify the required selection lines for an 8-line-to-1-line multiplexer.
a) 2 b) 4
c) 8 d) 3

(v) Identify the correct size of the decoder to map 2000 memory addresses.
a) 3:8 b) 10 : 1024
c) 11 : 2048 d) 12 : 4096

(vi) Choose the correct option that explain the significance of excitation table in a D flip-flop.
a) Describing the behavior of the flip-flop b) Assigning priority to inputs
c) Identifying clock edges d) Setting the flip-flop output

(vii) Choose the correct option to describe the behavior of an SR flip-flop with a high clock input and both S and R inputs low.
a) The Q output is set to 1 b) The Q output is set to 0
c) The flip-flop enters an undefined state d) The flip-flop toggles

(viii) Identify the flip-flop known for its ability to store and propagate a single data bit is
a) D flip-flop b) JK flip-flop
c) SR flip-flop d) T flip-flop

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(ix) Choose the correct full form of BCD
a) Binary Coded Decimal
b) Binary Counting Device
c) Binary Clock Display
d) Binary Counter Device

(x) Select a type of counter that can count in both up and down directions.
a) Universal counter
b) BCD counter
c) Ring counter
d) Johnson counter

(xi) Write the full form of PLA in Programmable Logic Devices.
a) Programmable Logic
b) Programmable Logic Array
c) Programmable ROM
d) Programmable RAM

(xii) Choose a type of memory that can be electrically erased.
a) RAM
b) ROM
c) EEPROM
d) PROM

(xiii) Demonstrate the primary function of Dynamic RAM.
a) Fast and volatile memory
b) Slow and volatile memory
c) Slow and non-volatile memory
d) Fast and non-volatile memory

(xiv) Define the other name of NOT Gate
a) Derived Gate
b) Universal Gate
c) Inverter
d) None of these

(xv) Select the correct number to add to convert an invalid BCD to a valid BCD.
a) 0110
b) 111
c) 1111
d) 1110

Group-B
(Short Answer Type Questions) 3 x 5=15

2. Illustrate the circuit diagram of a D flip flop (3)
3. Interpret "Master-Slave flip-flop is also known as a pulse-triggered flip-flop". (3)
4. Explain the basic purpose of digital circuits in electronics (3)
5. Discuss the differences between synchronous and asynchronous counters. (3)
6. Analyze the key characteristics of a double-digit counter. (3)

OR

Analyze the working principle of synchronous counter. (3)

Group-C
(Long Answer Type Questions) 5 x 6=30

7. Explain various binary codes, including Binary Coded Decimal (BCD), Excess-3, and Gray codes, elucidating their applications and advantages in digital circuits. (5)
8. Distinguish between SR, JK, T, and D flip-flops, and analyze the scenarios and each type is most appropriate for designing sequential circuits. Provide examples to illustrate your explanation (5)
9. Express the impact of clock frequency on the performance of clocked sequential circuits, and write about the trade-offs involved in selecting an appropriate clock frequency for a specific application. (5)
10. Explain the design and working principles of a universal shift register. Illustrate its ability to perform parallel load, serial input, serial output, and bidirectional shifting, and write down the truth table for its operation. (5)
11. Discuss 2-to-4 Decoder with proper diagram (5)

12. Express various methods of minimization in Boolean algebra, such as Karnaugh maps, Quine-McCluskey, and algebraic manipulation. (5)

OR

Interpret the role of number systems and Boolean algebra in digital signal processing (DSP), (5)
and discuss the concepts used to manipulate and process signals in DSP applications.

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