

P. R. THAKUR GOVT. COLLEGE

Department of Physics

B.Sc. Semester-III Internal Examination, 2023-24

Paper - PHSACOR07T

DIGITAL ELECTRONICS

FULL MARKS 20

TIME -60 MIN

ANSWER ANY FIVE

(2× 5 = 10)

- Convert $(59.72)_{10}$ to BCD
- Assign the proper odd parity bit to the code 111001.
- Convert the binary number 1100 to Gray code.
- If a 3-input NOR gate has eight input possibilities, how many of those possibilities will result in a HIGH output?
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- What does the small bubble on the output of the NAND gate logic symbol mean?
- When used with an IC, what does the term "QUAD" indicate?
- When the output of a NOR gate is HIGH?
- In the decimal numbering system, what is the MSD?
- What is a digital-to-analog converter?
- What are the symbols used to represent digits in the binary number system?

ANSWER ANY TWO

(5× 2 = 10)

- State and explain De Morgan's theorems.
- Draw a diagram and explain how to build a NOT Gate using a transistor.
- Why is an exclusive-NOR gate also called an equality gate?
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- Convert the following SOP expression to an equivalent POS expression.

$$ABC + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C} + \bar{A}\bar{B}C$$

INTERNAL ASSESMENT 2022-23

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Paper:PHSACOR07T

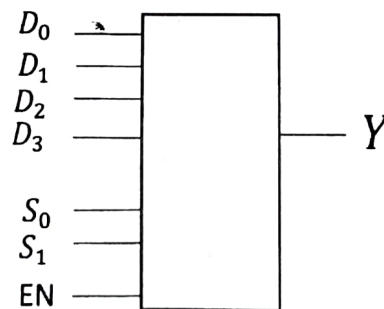
Full Marks -20

Time- 1 hr

Date-19/12/2022

Answer any ten questions from the following questions ($10 \times 2 = 20$)

1. What are the fundamental properties of Boolean algebra?
2. What is meant by K-Map or Karnaugh Map?
3. What are the limitations of the Karnaugh Map?
4. Define Fan-in. **Department of Physics
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5. What are the applications of Flip-Flops?
6. What is the difference between D-latch and D Flip-flop?
7. How is a J-K flip-flop made to toggle?
8. For the device shown here, let all D inputs be LOW, both S inputs be HIGH, and the EN input be LOW. What is the status of the Y output?



9. Which flip flop is called as universal flip flop? And why?
10. Explain what are preset and clear inputs of flip flops?
11. Convert the following Binary number into Gray code. (i) 1111 (ii) 1101001
12. Realize the following function using demultiplexer: $F(A, B, C, D) = \sum m(1, 2, 5, 6, 7, 11, 14)$
13. Design a four bit BCD adder using IC 7483 and NAND gates. **Department of Physics
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14. Reduce the following Boolean expression using Boolean laws. $Y = AB + \bar{A}B + A\bar{B} + \bar{A}\bar{B}$

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B.Sc. Semester-III Internal Examination, 2021

Paper – PHSACOR07T

Digital Systems and Applications.

1. Answer any five **(5 × 2 = 10)**

- a) Convert Binary number 01001 to Gray code.
- b) Convert $(00110010)_2$ signed Binary number (in 2^{nd} compliment representation) in decimal number.
- c) write down the Boolean function corresponding to the following standard sum-of-product notation $f(A, B, C) = \sum m(3, 4, 6, 7)$
- d) Implement NOR Gate using NAND only.
- e) Why NAND gate and NOR Gate are called Universal Gate?
- f) Show that in negative logic OR gate is the same circuit as positive logic AND gate.
- g) Implement AND with OR and NOT gate.
- h) the 1's complement circuit using XOR gate.

2. Answer any two. **(2 × 5 = 10)**

- a) What are half subtractor and full subtractor explain their operation by using the necessary truth table. (2.5+2.5)
- b) Design a XOR and XNOR using minimum number of NAND gate. (2.5+2.5)
- c) Draw the logic block diagram for adding two decimal number 7 and 12. 5
- d) Show that $(A \oplus B) \oplus C = A \oplus (B \oplus C)$. 5