

(6 pages)

Reg. No. :

Code No. : 20302 E Sub. Code : CMPH 62

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Sixth Semester

Physics — Core

DIGITAL ELECTRONICS

(For those who joined in July 2021 and 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. Convert the binary number 1001.0010_2 to decimal
(a) 90.125 (b) 9.125
(c) 125 (d) 12.5
2. The BCD number for decimal 347_{10} is
(a) 1100 1011 1000 (b) 0011 0100 0111
(c) 0011 0100 0001 (d) 1100 1011 0110

3. DeMorgan's theorem states that _____.
(a) $(AB) = A' + B'$ (b) $(A + B) = A' * B$
(c) $A' + B' = A' B'$ (d) $(AB) = A' + B$
4. Which input values will cause an AND logic gate to produce a HIGH output?
(a) At least one input is HIGH
(b) At least one input is LOW
(c) All inputs are HIGH
(d) All inputs are LOW
5. 3 bits full adder contains _____.
(a) 3 combinational inputs
(b) 4 combinational inputs
(c) 6 combinational inputs
(d) 8 combinational inputs
6. Which of the following is correct for a gated D-type flip-flop?
(a) The Q output is either SET or RESET as soon as the D input goes HIGH or LOW
(b) The output complement follows input when enabled
(c) Only one of the inputs can be HIGH at a time
(d) The output toggles if one of the inputs is held HIGH

7. The Karnaugh map (K-map) is an abstract form of _____ diagram organized as a matrix of squares.
- Venn diagram
 - Cycle diagram
 - Block diagram
 - Triangular diagram
8. How many select lines would be required for an 8-line-to-1-line multiplexer?
- 2
 - 4
 - 8
 - 3
9. The full form of SIPO is
- Serial-in Parallel-out
 - Parallel-in Serial-out
 - Serial-in Serial-out
 - Serial-in Peripheral-out
10. How many flip-flops are required to construct a decade counter?
- 4
 - 8
 - 5
 - 10

PART B — (5 × 5 = 25 marks)

Answer ALL questions by choosing (a) or (b).
Each answer should not exceed 250 words.

11. (a) Convert 159_{10} to the octal number system.

Or

- (b) Find the difference between binary numbers $110101_2 - 100010_2$ using 1's complement.

12. (a) Explain the working principle of AND gate with a neat diagram.

Or

- (b) Draw the symbol and explain the truth table for EX-OR gate.

13. (a) Describe the operation of JK master slave flip flop.

Or

- (b) Summarize monostable multivibrator.

14. (a) Reduce the following Boolean expression using K-map :

$$F(A, B, C, D) = \Sigma(0, 3, 4, 5, 7, 9, 11, 12, 13, 14)$$

Or

- (b) Analyze the working principle of Encoder.

15. (a) Outline the concept of Ring counter.

Or

- (b) Describe about the analog to digital converter.

PART C — (5 × 8 = 40 marks)

Answer ALL questions by choosing (a) or (b).

Each answer should not exceed 600 words.

16. (a) Find 2's complement of $10110_2 - 11010_2$.

Or

- (b) (i) Convert the binary number $(10101101)_2$ into its gray code.

- (ii) What is the feature of gray code? What are its applications?

17. (a) Describe about the basic logic gates with truth table.

Or

- (b) Obtain AND gates from the NAND and NOR gates.

18. (a) Explain Half subtractor.

Or

- (b) Discuss about the clocked RS flip-flop.

19. (a) Summarize Multiplexer.

Or

- (b) Appraise Decoder.

20. (a) Extend the theory of Parallel-in-Serial out shift register.

Or

- (b) Build asynchronous counter.