

(6 pages)

Reg. No. :

Code No. : 30308 E Sub. Code : AMPH 62

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2024.

Sixth Semester

Physics — Core

DIGITAL ELECTRONICS

(For those who joined in July 2020 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The grey code of 13 is
(a) 1111 (b) 1000
(c) 1101 (d) 1011
2. The decimal number 2 in binary _____
(a) 00100 (b) 00010
(c) 01000 (d) 00110
3. The expression $A + \overline{A}B + \overline{A}\overline{B}$ can be simplified as
(a) A (b) $\overline{A}$
(c) 1 (d) 0
4. The inputs of a logic gate has inputs 0 and 1, the output will be zero if it is a _____.
(a) XOR gate (b) OR gate
(c) AND gate (d) NAND gate
5. The two outputs of RS-flip flop are _____.
(a) always low (b) always high
(c) low or high (d) complementary
6. A half adder
(a) add two bits
(b) add three bits
(c) perform decimal addition
(d) has one output
7. The number of cells in a four variable Karnaugh map is
(a) 8 (b) 4
(c) 32 (d) 16

8. A demultiplexer has _____ input and many outputs.

- (a) 2 (b) 1
(c) 3 (d) 4

9. A 6FF counter is a

- (a) mod-6 counter (b) mod-64 counter
(c) mod-8 counter (d) mod-36 counter

10. ABCD counter has _____.

- (a) 3 distinct states
(b) 8 distinct states
(c) 10 distinct states
(d) 16 distinct states

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) (i) Convert 10101_2 into its decimal equivalent.

(ii) Convert 79_{10} into binary number.

Or

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(b) (i) Express decimal number 5280 in excess-3 code.

(ii) Convert gray number 11011 to its BCD equivalent.

12. (a) Justify the Boolean expression.

$$ABCD + ABC\bar{D} + \bar{A}BCD + \bar{A}BC\bar{D}.$$

Or

(b) (i) Give the truth table of EX-OR gate.

(ii) State the two de-Morgan's theorem.

13. (a) Describe RS flip-flop with diagram.

Or

(b) Describe JK flip-flop with diagram.

14. (a) Explain Karnaugh map.

Or

(b) Differentiate multiplexer and demultiplexer.

15. (a) Discuss Mod-5 counter.

Or

(b) Explain the term Ring Counter.

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PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16. (a) (i) Explain binary addition and binary subtraction with examples.
(ii) Explain with examples of hexa-decimal and BCD number system.

Or

- (b) (i) Convert decimal 72905 into hexadecimals and binary equivalents.
(ii) Convert gray number 110101 into binary form.
(iii) What is the 2's complement of 10010 – 10011?

17. (a) Use Boolean algebra to prove $AB + BC + CA = (A + B)(B + C)(C + A)$.

Or

- (b) Give the circuit and truth table of NAND, NOR, EX-OR and EX-NOR gates.

18. (a) Explain SOP using NAND and NOR gates.

Or

- (b) Explain the K-map with three variables.

19. (a) Explain the construction and working of a full adder.

Or

- (b) Explain the action of a JK-flip-flop with diagram and truth table.

20. (a) Discuss the operations of D/A converter with binary ladder.

Or

- (b) Explain the action of Up/down counter with a neat diagram.