(6 pages) **Reg. No. :** .....

Code No. : 30458 E **Sub. Code : CMPH 62**

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

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 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The octal equivalent of the binary number 11010111 is

   (a) 656 (b) 327

   (c) 653 (d) D7

2. The decimal number 279 will be represented in

   (a) 001001111001 (b) 0101 1010 1100

   (c) 100010111 (d) 100011010

3. The most suitable gate for comparing two bits is:

   (a) AND (b) OR

   (c) NAND (d) EX-OR

4. $AB + \overline{A}C + BC$ is equivalent to:

   (a) $AB + BC$ (b) $AB + \overline{A}C$

   (c) $\overline{A}C + BC$ (d) AC

5. To subtract 4 bit numbers, the number of half subtractors and full subtractor needed are

   (a) 1, 5 (b) 5, 1

   (c) 4, 1 (d) 1, 3

6. FLIP – FLOPS can be used to make

   (a) latches

   (b) bounce elimination switches

   (c) registers

   (d) all of the above

7. The number of cells in a 6-variable K-map is

   (a) 6 (b) 12

   (c) 36 (d) 64

8. A multiplexer can be used as a

(a) logic element

(b) flip flop

(c) counter

(d) 7 segment LED driver

9. The number of states in a decade counter is

(a) 4 (b) 8

(c) 10 (d) 16

10. A shift register is a

(a) random access memory

(b) sequential accessed memory

(c) read only memory

(d) content addressable memory

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Convert the following Gray code to binary.

(i) 110101

(ii) 101011

(iii) 1011.

Or

(b) Discuss the various binary representation with examples.

12. (a) State and explain laws of Boolean algebra.

Or

(b) Explain NOR as universal building block.

13. (a) What is a full adder? Explain its operation with truth table.

Or

(b) Explain the function of T-flipflop with truth table.

14. (a) What do you understand by Minterms and Maxterms?

Or

(b) Explain the construction of encoder with logic and truth table.

15. (a) Discuss briefly the 4-bit input shift register with timing diagram.

Or

(b) Discuss the working of a four bit asynchronous ripple with logic diagram and truth table.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Perform the following subtraction using 2's complement method

(i) 01000 – 01001

(ii) 01100 – 00011.

Or

(b) Explain ASCII code and Excess 3 code.

17. (a) Discuss the implementation of OR-AND-INVERT.

Or

(b) With a neat diagram explain the operation of NAND and NOR gates.

18. (a) Explain the half subtractor and full subtractor with suitable logic diagram with truth table.

Or

(b) Draw the logic diagram of JK-flipflop and explain its operation.

19. (a) Describe SOP and POS forms of expression.

Or

(b) Explain the function of Demultiplexer using diagram.

20. (a) Explain PISO and PIPO shift registers with logic diagram.

Or

(b) Explain the operation of Mod – 10 counter.

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