Reg. No. U 1 8 E B 2 1 S 0 4 0 4

I Semester B.Sc. Degree Examination, May/June - 2022
ELECTRONICS
Digital Fundamentals (Open Elective)
(NEP Scheme - 2020)
Paper : ELE - OE - 1.5

Time : 2½ Hours   Maximum Marks : 60

Instructions to Candidates:

Answer all the questions from Part A, any Ten questions from Part B, and any FOUR questions from Part C.

Note: Answer all the questions of Part A in any one page and to be answered the same questions multiple times will not be considered for Evaluation.

PART - A

1. Answer all the subdivisions.   (20×1=20)

   i. A group of 8 bits is called _____.
      a. Nibble   b. Byte
      c. Kilobyte   d. Megabyte

   ii. The base of Hexadecimal number is _____
      a. 2   b. 10
      c. 8   d. 16

   iii. Octal number system is a _____ number system.
      a. Positional   b. Non - positional
      c. Both a and b   d. Un weighted

   iv. Binary equivalent of grey code $11100_{(gray)}$ is
      a. $10111_{(2)}$ b. $11000_{(2)}$
      c. $00011_{(2)}$ d. $11011_{(2)}$

v. The product of $101_{(2)} \times 110_{(2)}$ is

     a. $00110_{(2)}$ b. $10101_{(2)}$

     c. $11110_{(2)}$ d. $01010_{(2)}$

vi. The output of $1101_{(2)} - 0010_{(2)}$ is

     a. $0011_{(2)}$ b. $0100_{(2)}$

     c. $1100_{(2)}$ d. $1011_{(2)}$

vii. 1's complement of $010011_{(2)}$ is

     a. $001100_{(2)}$ b. $101010_{(2)}$

     c. $101100_{(2)}$ d. $110011_{(2)}$

viii. BCD stands for

     a.   Binary Coded Data   b.   Bit Coded Data

     c.   Binary Coded Decimal   d.   Bit Coded Decimal

ix. If even number of one's are present in the binary code, then the value of even parity bit should be

     a.   1   b.   0

     c.   Tri state   d.   Unknown.

x. The value of $A \cdot 1$ is.

     a.   A   b.   1

     c.   0   d.   unknown

xi. $A \cdot B = B \cdot A$ refers to

     a.   Associative law   b.   Distributive law.

     c.   Commutative law   d.   Involution law

xii. The output of AND gate is high when

     a.   All inputs are low   b.   All inputs are high

     c.   Any input is low   d.   Any input is high

xiii. Number of inputs for NOT gate is

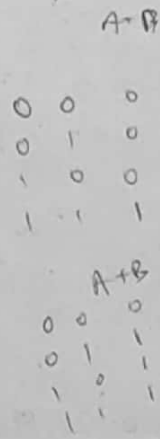   a.   2   b.   1

     c.   3   d.   4

xiv. The output of OR gate is low when

     a.   Any input is low   b.   Any input is high

     c.   All inputs are low   d.   All inputs are high

xv. The Boolean expression $A \cdot B + B \cdot C$ represents _____.

   a.   Max term   b.   Min term

   c.   Sum of product   d.   Product of sum

xvi. IC 7400 is a two input

   a.   OR gates   b.   AND gates

   c.   NAND gates   d.   XOR gates

xvii. The value of $A + \bar{A}$ is

   a.   A   b.   1

   c.   0   d.   Unknown

xviii. Don't care condition in K map is represented as

   a.   0   b.   X

   c.   1   d.   Both a & b

xix. A two variable K map consists of

   a.   2 cells   b.   4 cells

   c.   8 cells   d.   16 cells

xx. Grouping of 4 cells in K - map refers to

   a.   Pair   b.   Quad

   c.   Octet   d.   Don't care.

PART - B

(10×2=20)

Answer any **TEN** questions.

2. What do you mean by positional and non - positional number systems?

3. With an example explain the term base of a number system.

4. What is binary equivalent of $13_{(10)}$.

5. Find the sum of $1101_{(2)}$ and $0110_{(2)}$.

6. Mention the steps involved in converting a gray code to binary.

7. What is the result of $11010_{(2)} \times 101_{(2)}$?

8. Write a note on error detection and correction code.

9. Convert 1011010 to binary code.

10. Write the truth table and logic symbol of XOR gate.

11. Convert xy + xyz expression to standard SOP.

[P.T.O.

12. Simplify the Boolean expression $xyz + x + xz$.

13. Realise the expression $Y = ABC + \bar{A}B$ using basic logic gates.

14. Explain with an example, rolling in K-map.

15. Construct K-map for 2 input OR gate.

16. Show the simplification of Octate in K map.

PART - C

Answer any **Four** questions. $(4 \times 5 = 20)$

17. Convert $88_{(10)}$ to $(\ )_{(2)}$, $(\ )_{(8)}$ and $(\ )_{(16)}$.

18. Subtract $64_{(10)}$ from $45_{(10)}$ using 2's complement method.

19. With a neat circuit diagram, logical symbol and truth table explain XNOR gate.

20. State and prove De Morgan's theorems.

21. Simplify the Boolean expression

$$f(w, x, y, z) = \sum(m_0, m_3, m_4, m_6, m_8, m_{11}, m_{13}, m_{15}) \text{ using K - map.}$$

22. Simplify the Boolean expression $f(a, b, c, d) = \sum(1, 3, 5, 9, 13) + \sum d(2, 4, 8, 15)$ using K-map.