

This question paper contains 3 printed pages]

NA—96—2023

FACULTY OF SCIENCE

B.Sc. (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2023

(New Course)

ELECTRONICS

Paper II

(Basic Digital Electronics)

(Wednesday, 20-12-2023)

Time : 10.00 a.m. to 12.00 noon

Time—Two Hours

Maximum Marks—40

N.B. :- (i) Attempt *All* questions.

(ii) Illustrate your answers with suitably labelled diagrams wherever necessary.

1. Explain NOR gate. Give the symbol truth table and Boolean equation of it. Explain universal property of NOR gate.

Draw logic circuit for the following Boolean equation using NOR gate and basic gates :

15

$$Y = \overline{A+B}$$

P.T.O.

Or

(a) Perform the following conversion : 8

(i) $(1100101)_2 = (?)_{16}$

(ii) $(121)_8 = (?)_{10}$

(iii) $(BB)_{16} = (?)_8$

(iv) $(111.11)_2 = (?)_{10}$

(b) Explain Binary subtraction using 2's complement for the following binary numbers : 7

(i) $1001 - 0110$

(ii) $1010 - 1110.$

2. Explain pair, quad and octet for the cell grouping in K-mapping. Explain simplification of Boolean expression using K-map. 15

Solve the following :

$$Y = f(A, B, C, D) = \sum m(0, 2, 4, 6, 8) + d(10, 11, 12, 13, 14, 15)$$

Or

(a) What is the difference between Half and Full adder ? Implement the action of full adder with two half adder. Give its truth table. 8

(b) Explain parallel binary adder with suitable diagram. 7

3. Attempt the following (any *two*) : 10

- (a) State and explain Demorgan's First Theorem.
- (b) Explain conversion of Gray Code to Binary Code.
- (c) State and prove associative law in Boolean Algebra.
- (d) Explain full subtractor.