This question paper contains **2** printed pages]

NA—17—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

NOVEMBER/DECEMBER, 2023

(CBCS/New Pattern)

PHYSICS

Paper–XV

(Digital and Communication Electronics)

(Wednesday, 6-12-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Figures to the right side indicate full marks.

(*iii*) Use of non-programmable calculator is allowed.

1. Draw the logic symbols, logic equations and truth tables for OR, AND, NOT, NAND and EX-OR logic gates. 15

Or

(*a*) Perform the following arithmetics of the given numbers : 8

(*i*) 1011 + 1001

P.T.O.

(*ii*) 1010 – 111

(*iii*) 110001 × 1110101

(*iv*) 1111101 ÷ 101.

(*b*) Explain Gray and Excess-3 codes. 7

2. Derive an expression for amplitude modulated wave in terms of modulation index with corresponding wave forms. Explain frequency spectrum of AM wave. 15

Or

(*a*) Draw the block diagram of superheterodyne radio receiver. Explain function of each block. 8

(*b*) Draw block diagram of basic communication system and explain function of each. 7

3. Write short notes on any *two* : 10

(*a*) Hexadecimal number system

(*b*) Half adder

(*c*) Linear diode AM detector

(*d*) AM receiver.