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

Y—121—2019

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2019

(CGPA Pattern)

PHYSICS

Paper-XV (PHY-305)

(Digital and Communication Electronics)

(Saturday, 21-12-2019)   **Time : 10.00 a.m. to 12.00 noon**

Time—2 Hours   *Maximum Marks—40*

N.B. :— (i) Attempt *All* questions.

    (ii) *All* questions carry equal marks.

    (iii) Figures to the right indicate full marks.

    (iv) Non-programmable calculators are allowed.

1. Attempt any *four* :   8

    (a) Convert the following :

        $(1010)_2 \rightarrow (?)_8$

        $(110111)_2 \rightarrow (?)_8$

    (b) Draw the truth table of three inputs of AND Gate.

    (c) Define Amplitude modulation.

    (d) Define sensitivity and selectivity of A.M. Receiver.

    (e) Perform the following operations :

        $(111)_2 \quad - (010)_2$

        $(101)_2 \times (11)_2.$

    (f) Give the Boolean expression for NAND Gate and NOR Gate.

    (g) Define modulation index of F.M. wave.

    (h) Give any *two* limitations of Base band transmission.

                                                        P.T.O.

2. Attempt any *two* : 8

   (*a*) Convert the following Decimal No. to binary numbers by Repeated division by *two* methods :

     (*i*) $(27)_{10}$

     (*ii*) $(576)_{10}$.

   (*b*) Explain universal properties of NAND Gate.

   (*c*) Explain the necessity of modulation in communication system.

3. Attempt any *two* : 8

   (*a*) Simplify given Boolean expressions using K-map.

     X = AB + C.

   (*b*) Draw the block diagram of basic communication system and explain any *one* block.

   (*c*) Draw waveforms of AM wave and obtain expression for modulation index.

4. Attempt any *one* : 8

   (*a*) Derive an expression for A.M. voltage. Hence explain the frequency spectrum of A.M. wave.

   (*b*) Give the block diagram of superheterodyne receiver and explain function of each block.

5. Write short notes on any *two* : 8

   (*a*) Power output in A.M. wave

   (*b*) EX-NOR Gate

   (*c*) Excess-3 code

   (*d*) Octal number system.