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B—118—2019

FACULTY OF SCIENCE

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

MARCH/APRIL, 2019

(CBCS Pattern)

PHYSICS

Paper-XV-A

(Digital and Communication Electronics)

(Tuesday, 2-4-2019) **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. Attempt any *four* : 8

(*a*) Define B.C.D. code.

(*b*) Convert $(110011101010)_{Gray} = (?)_2$.

(*c*) State Demorgan's first theorem.

(*d*) State Commutative law of Boolean algebra.

(*e*) What is demodulation.

(*f*) In the expression :

$e_c = E_c \cos w_c t$,

E_c and w_c – stands for what ?

(*g*) Define selectivity in radio receiver.

(*h*) Define Half duplex.

2. Attempt any *two* : 8

(*a*) Define octal no. system and solve the following :

$$(9650)_{10} = (?)_8$$

(*b*) Give the universal properties of NAND Gate.

(*c*) Explain the importance of modulation factor in Amplitude modulation.

(*d*) Give the block diagram of basic communication system. Explain any *one* stage in detail.

P.T.O.

3. Attempt any *two* : 8

(*a*) Simplify the given expression by using Boolean algebra :

$$A.B + A\,(B + C) + B\,(B + C) = Y$$

(*b*) Explain Ex-3 code is a self complementing code and perform the following by using Ex-3 code :

$$\begin{array}{r} 567 \\ +\ 247 \\ \hline \end{array}$$

(*c*) Give the expression for amplitude modulated voltage.

4. Attempt any *one* : 8

(*a*) Simplify Boolean expression by using k-map and draw its simplified logical circuit :

$$X = \overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}B\overline{C}\,\overline{D} + AB\overline{C}\,\overline{D} + A\overline{B}\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}CD + A\overline{B}CD$$
$$+\overline{A}\,\overline{B}C\overline{D} + \overline{A}BC\overline{D} + ABC\overline{D} + A\overline{B}C\overline{D}$$

(*b*) Explain power in A.M. waves.

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

(*a*) 1's 2's complement.

(*b*) Perform the following :

(*i*)
$$\begin{array}{r} 5\ C\ 3\ 9 \\ +\ D\ 4\ E\ 1 \\ \hline \end{array}$$

(*ii*)
$$\begin{array}{r} 6\ 2\ 5\ A\ E\ .\ F\ D \\ +\ 8\ 9\ 1\ B\ C\ .\ 9\ 8 \\ \hline \end{array}$$

(*c*) Tuned Radio Frequency receiver (T.R.F.).

(*d*) Receiver and transmitter in communication system.