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GA—27—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION
APRIL/MAY, 2023

(CBCS/Old Course)

PHYSICS

Paper–XV

(Digital and Communication Electronics)

(Wednesday, 26-4-2023) **Time : 10.00 a.m. to 12.00 noon**

Time— Two Hours *Maximum Marks*—40

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

(*ii*) *All* questions carry equal marks.

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

(*iv*) Use of logarithmic table and non-programmable calculator is allowed.

1. Attempt any *four* of the following : 8

(*a*) Define BCD code.

(*b*) Perform $(654)_8 = (?)_2$.

(*c*) Draw logic symbol and truth table for NOT gate.

(*d*) State DeMorgan's first theorem.

(*e*) What are the types of the modulation ?

(*f*) Define modulation index of FM.

P.T.O.

(*g*) Define selectivity in radio receiver.

(*h*) Define base band signal.

2. Attempt any *two* of the following : 8

(*a*) Perform :

(*i*) $(1110)_2 + (0101)_2$

(*ii*) $(10111)_2 - (01101)_2$

(*b*) Discuss TRF using its labelled diagram.

(*c*) Explain Ex-3 code is a self-complementing code and perform :

$$\begin{array}{r} 367 \\ +231 \\ \hline \end{array}$$

3. Attempt any *two* of the following : 8

(*a*) Draw the block diagram of basic communication system. Explain each stage in brief.

(*b*) Perform :

(*i*) $(695)_{10} = (?)_2$

(*ii*) $(ASD)_{16} = (?)_2$

(*c*) Explain characteristics of radio receivers; sensitivity and fidelity.

4. Attempt any *one* of the following : 8

(*a*) Define modulation. Derive an expression for amplitude modulated voltage.

(*b*) Realise the four variable logic function :

$$Y = AB\bar{C}D + \bar{A}BCD + \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}\bar{D} + \bar{A}\bar{C} + A\bar{B}C + \bar{B}.$$