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BF—98—2016

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2016

(New Course)

PHYSICS

Paper XV (Phy-305)

(Digital and Communication Electronics)

(Monday, 24-10-2016) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. Attempt any *four* : 8

(*a*) What do you mean by wire and wireless communication ?

(*b*) Define base band signal.

(*c*) Define sensitivity, selectivity and fidelity of AM receiver.

(*d*) Define AM and FM.

(*e*) State distributive laws.

(*f*) State AND laws.

(*g*) Draw the circuit diagram of EX-NOR gate using basic gates.

(*h*) Draw the truth table and logic symbols of OR gate and NOR gate.

2. Attempt any *two* : 8

(*a*) Perform the following conversions :

$(654)_8 = (?)_2$

$(498)_{10} = (?)_2$

$(ABC)_{16} = (?)_2$

$(1001110)_2 = (?)_8$

(*b*) State and explain De Morgan's theorems.

(*c*) Explain the frequency spectrum of amplitude modulated wave with neat diagram.

P.T.O.

3. Attempt any *two* : 8

(*a*) Construct OR, AND, NOT and NAND gate using NOR gate.

(*b*) Draw K-map, for the following expression :

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

(*c*) Draw the block diagram of superheterodyne receiver and explain function of each block.

4. Attempt any *one* : 8

(*a*) Define modulation index and deviation ratio for FM. Obtain an expression for frequency modulated wave.

Or

(*b*) Why do you need modulation ?

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

(*a*) Universal properties of NAND gate

(*b*) Linear diode detector

(*c*) Basic communication system

(*d*) TRF receiver.