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W—103—2018

FACULTY OF SCIENCE

B.Sc. (Sixth Semester) EXAMINATION

OCTOBER/NOVEMBER, 2018

(New Course)

PHYSICS

Paper XV–A (PHY-305)

(Digital and Communication Electronics)

(Tuesday, 23-10-2018)

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 indicate full marks.

1. Attempt any *four* : 8
 - (a) State associative law.
 - (b) Convert the binary numbers $(11011)_2$ and $(101010)_2$ to equivalent gray code.
 - (c) Draw logic symbol and truth table for Ex-OR gate.
 - (d) Define base band signal and base band transmission.
 - (e) Define amplitude modulation.
 - (f) Define modulation index and deviation ratio for FM.
 - (g) Convert hexadecimal number A85 to a decimal number.
 - (h) Explain the function of RF section of a superheterodyne receiver.
2. Attempt any *two* : 8
 - (a) Convert the following hexadecimal numbers to their octal equivalent :
 - (i) 0·A8
 - (ii) BC·8A
 - (b) Describe power output in AM wave.
 - (c) Apply DeMorgan's theorem to the expression $\overline{\overline{A + B} + \overline{CD}}$.

P.T.O.

3. Attempt any *two* : 8
- Explain Excess-3 code.
 - Explain TRF receiver.
 - Define and explain types of modulation.
4. Attempt any *one* : 8
- What is the importance of radio receiver ? Explain in detail.
 - Draw neat labelled circuit diagram for linear diode AM detector. Explain the operation of a diode as demodulator for AM.
5. Attempt any *two* : 8
- Discuss wave forms of amplitude modulated voltage.
 - State and explain commutative law for Boolean addition and multiplication for three variables A, B and C. Represent it with logic gates.
 - Perform the following conversions :
 - $(654)_8 = (?)_2$
 - $(10101)_2 = (?)_{10}$
 - $(598)_{10} = (?)_2$
 - $(A5D)_{16} = (?)_2$
 - Solve the following :
 - $(1101)_2 + (1011)_2$
 - $(1011)_2 + (1001)_2$
 - $(111)_2 + (101)_2 + (100)_2$
 - $(1101)_2 + (1001)_2 + (1000)_2$