RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2017

SECOND YEAR [BATCH 2015-18]

Date : 27/05/2017 **ELECTRONICS (General)**

Time : 11 am – 1 pm **Paper :** IV Full Marks : 50

Answer **any five** questions from the following: [5X10]

1. a) Explain the need for modulation in a communication system. Mention various classes of modulation techniques. 2+1
   b) Derive an expression for AM signal. From that expression define lower and upper side frequencies. 4+1
   c) Define modulation index for AM technique. 2

2. a) Give a comparative study between DSB and SSB signals. 3
   b) Describe the operation of diode detector circuit as an AM demodulator. 4
   c) A 1 KW carrier is amplitude modulated by an audio signal. If the percentage modulation is 60, determine the total power of the modulated wave. 3

3. a) What do you mean by the term 'Noise' used in communication system? 2
   b) State and prove Parseval's theorem for energy signal. 3
   c) Define and explain power and energy signals. 2½+2½

4. Write short notes on **any two** of the following: 2X5
   a) Noise in two port network.
   b) Frequency and time domain representation of signals.
   c) Pulse Code Modulation
   d) Delta Modulation

5. Define and explain **any four** of the following: 4X2·5
   a) Aperiodic signal
   b) Shot noise
   c) SNR
   d) Baud rate
   e) Shanon's theorem
   f) GPRS
   g) TDMA

6. a) Define Noise Figure and Noise temperature. State and explain the sampling theorem. 2+3
   b) What do you mean by quantization of a sampled signal? How this is used for encoding of the sampled signal? 2+3

7. a) Determine receiver's noise figure in decibels and its equivalent noise temperature. A receiver is connected to an antenna whose resistance is 50 Ω. The equivalent noise resistance of this receiver is 30Ω. 2
   b) Why Schmitt trigger circuit is used in PWM modulation technique? 2

c) Calculate the Nyquist rate for sampling when a continuous time signal is given by $x(t) = 5\cos 100\pi t + 10\cos 200\pi t - 15\cos 300\pi t$. 2

d) What do you mean by channel capacity? In a DSL system the bandwidth is 1 MHz and SNR is 20 dB. Find its channel capacity. 1+3

8. a) Explain PAM, PWM and PPM with schematic diagrams. 3

b) Give the working principle of a sample-and-hold circuit which can produce PAM. 5

c) Why is delta modulation advantageous than pulse code modulation? 2

———— × ————