IT /Ⅲ/CBGS/PA &DC| 18-05-2017

Principles of Analog & Digital Communication.

Q.P. Code : 552202

(3 Hours) [Total Marks : 80]

Note: 1) Question **No.1** is **compulsory.**
2) Out of remaining attempt **any three**.
3) Assume & mention suitable data wherever required.
4) **Figures** to **right** indicates **full marks.**

1. Solve **any four**   20
   a) Compare analog and digital communication system.
   b) Define modulation. Explain and justify any two need of modulation.
   c) Explain in brief Pre-emphasis and De-emphasis in FM.
   d) Explain in brief the process of quantization.
   e) What is line coding. Draw the NRZ and Manchester signal for the following binary signal 10111010.

2. a) Explain the term thermal noise. Prove that the noise voltage $V_n = \sqrt{4kTBR}$ For   10 electronic device operating at a temperature of 17°C with a bandwidth of 10 KHz, determine
   1. Thermal noise power in dBm. 2. RMS noise voltage for a 100 Ω internal resistance and a 100 Ω load resistance.

   b) State and prove time scaling property of Fourier transf01m. Determine the   10 Fourier transform for a rectangular pulse of amplitude 'A' and time period 'T' is from-T/2 to+ T/2

3. a) An AM signal appears across a 50 Ω load and has the following equation   10 v(t)= 12(1+ sin 12.566 x 10³t) sin18.85 x 10⁶t volts

   i) Sketch the envelope of this signal in time domain.
   ii) Calculate modulation index, sideband frequencies, total power and bandwidth.

   b) What are the limitations of TRF' receiver. Explain how these limitations are   10 avoided using super heterodyne receiver.

4. a) With the help of neat circuit diagram explain the working of Ratio detector.   10
   b) What is multiplexing in communication system. Draw and explain in briefthe   10 transmitter and receiver of FDM.

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5. a) State and prove sampling theorem for low pass band limited signal .Explain   **10**
      aliasing error.
   b) What are the various pulse modulation techniques? Explain how PPM is   **10**
      obtained from PWM.

6. a) Explain in brief the generation and detection of Delta modulation.   **10**
   b) Explain the generation and detection of ASK signal with block diagram and   **10**
      waveforms.