S.E. Sem -IV (Rev) - Electronics 30/5/12
Basics of analog & digital communication
Systems

Con.4484-12   (3 Hours)   GN-8429
                                                                [Total Marks 100

N. B. (1) Question No. 1 is compulsory.
      (2) Answer any four out of remaining six questions.
      (3) Assumptions made should be clearly stated.
      (4) Answer to each new question to be started on a fresh page.

Q. 1) Answer the following: -   (20)

A) A 400 watts carrier is modulated to a depth of 75%. Find the total power in the
amplitude modulated wave. Assume the modulating signal to be a sinusoidal one.

B) The bit sequence 1011101011 is to be transmitted using following formats.
      i)   Unipolar RZ
      ii)   Unipolar NRZ
      iii) Bipolar RZ
      iv)   Bipolar NRZ
      v)   Split-Phase Manchester

Draw all the waveforms.

C) Describe the significance of the FM noise triangle.

D) Explain in brief the frequency-division multiplexing.

Q. 2. A) Define the following propagation terms: -   (10)
      i)   Critical Frequency & Critical Angle
      ii)   Virtual Height
      iii) MUF
      iv)   Skip Distance & Skip Zone
      v)   Free-Space Path Loss

   B) A receiver connected to an antenna whose resistance is 50 Ω has an equivalent
      noise resistance of 30 Ω. Calculate the receiver's noise figure in decibels & its
      equivalent noise temperature.   (5)

   C) Explain the difference between correlated and uncorrelated noise. (5)

Q. 3. A) Draw & explain the block diagram of an ISB transmitter.   (10)

   B) Draw & explain the "Third method" of SSB generation. That uses the
      balanced modulator to suppress the carrier.   (10)

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Q. 4. A) If the signal $V(t) = 20\sin(6.28*10^6 t + 10\sin 6.283*10^3 t)$ represents a phase-modulated signal, determine.   (5)
   i) The carrier frequency
   ii) The modulating frequency
   iii) The modulation index
   iv) The peak phase deviation

B) Describe the difference between FM & AM receiver, bearing in mind the different frequency ranges & bandwidths over which they operate.   (5)

C) Explain the operation of the balanced slope detector, using a circuit diagram & response characteristics.   (10)

Q. 5. A) Draw the block diagram for an AM superhetrodyne receiver & describe its operation & the primary function of each stage.   (10)

B) Describe the important parameters of radio receiver.   (10)

Q. 6. A) State & prove sampling theorem in time domain.   (10)

B) For a pulse-amplitude modulated transmission of voice signal having maximum frequency equal to fm = 3 kHz, calculate the transmission bandwidth. It is given that the sampling frequency fs = 8 kHz & the pulse duration $\tau = 0.1$ Ts   (10)

Q. 7. A) What is the slope overload distortion & granular noise in delta modulation?   How it is removed in ADM.   (10)

B) With the help of neat diagram. Explain the transmitter & receiver of pulse   code modulation.   (10)