S.E.(Sem.IV)/ELTL/Prin of Comm^n Engg/Dec 09

Con. 5595-09. (REVISED COURSE) SP-7856

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitbale** data if necessary and state if **clearly**.

1. Answer the following any **four** :– 20
   (a) Why do the amplifiers that follow the modulator circuit in AM DSBFC transmitter have to be linear ?
   (b) What is the purpose of AFC loop in FM ?
   (c) What is gearband when and where is it used ?
   (d) Explain the use of limiter in a FM receiver.
   (e) What are the causes of foldover distortion or aliasing ? How can it be prevented or removed ?

2. (a) Draw the block diagram of an AM superhetrodyne receiver. Describe its operation and primary functions of each stage. 10
   (b) List different methods of FM generation. Explain the principle of reactance modulator. Why is direct modulation not preferred for FM generation ? 10

3. (a) Draw the schematic of a ratio detector and describe its operation. 10
   (b) One input to a conventional AM modulator is a 500 kHz carries with an amplitude of 20 V_P. The second input is a 10 kHZ modulating signal that is of sufficient amplitude to cause a change in output wave of ± 7.5 V_P. Determine – 10
      (i) Upper and lower side frequencies
      (ii) Modulation coefficient and percent modualtion
      (iii) Expression for modulated wave
      (iv) Draw output spectrum
      (v) Sketch output envelope.

4. (a) Explain the working of balanced ring modulator to generate DSBSC signal. 8
   (b) For an angle modulated carrier $V_c = 6 \cos (2\pi\ 110\ Mhzt)$ with 75 kHz frequency deviation due to the information signal and a single frequency interfering signal $V_n = 0.3 \cos (2\pi\ 109.985\ Mhzt)$. Determine – 6
      (i) Frequency deviation due to interfering signal
      (ii) Voltage SNR at the output of demodulator.
   (c) The noise output of a reistor is amplified by a noiseless amplifier having a gain of 60 and a bandwidth of 20 kHz. A meter connected to output of amplifier reads 1 mv (RMS). If the bandwidth of amplifier is reduced to 5 kHz with gain constant, what is the reading of meter ? 6

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5. (a) Explain the block diagram of Adaptive delta modulation with waveforms. How does it reduce slope overload error ? **10**

   (b) Explain generation and detection of PWM signal. **10**

6. (a) State sampling theorem for bandpass signal. Compare ideal and practical sampling. **10**

   (b) Compare AM and FM. **5**

   (c) The output current of a 60% modulated AM wave is 1.5 A. To what value will the current rise if it is modulated additionally by another wave with 70% modulation index. **5**

7. Write short notes on any **four** of the following :– **20**

   (a) ISB transmission

   (b) Pre-emphasis and De-emphasis

   (c) Companding

   (d) AGC

   (e) Significance of Signal-to-Noise Ratio.
