S.E. (I.T.) Sem IV (R) 26/5/09

May 09 HP 71

Con. 3294-09. Principles of Communication Engineering VR-3862

(REVISED COURSE)

(3 Hours) [Total Marks : 100

3 p.m. to 6 p.m.

N.B. : (1) Answer any **five** of the following.
(2) Draw **neat** diagrams.
(3) Assume **suitable** data if **necessary**.

1. (a) A sinusoidal carrier has an amplitude of 10V and a frequency of 100 kHz. It is amplitude modulated by a sinusoidal voltage of amplitude 3V and frequency 500 Hz. Modulated voltage is developed across 75 Ω resistance : **12**
   (i) Write the equation for the modulated wave.
   (ii) Determine the modulation index.
   (iii) Draw the spectrum of modulated wave
   (iv) Calculate the total average power
   (v) Calculate the power carried by sidebands.
   (b) Define the following terms :– **8**
   (i) Noise figure
   (ii) Noise factor
   (iii) Noise temperature
   (iv) Signal to Noise Ratio.

2. (a) State and prove the following properties of Fourier Transform :– **10**
   (i) Time shifting
   (ii) Convolution.
   (b) (i) For three cascaded amplifier stages, each with noise figure of 3dB and power gain of 10 dB, determine the total noise figure. **4**
   (ii) Draw neat Block diagram of AM High Level Modulation and explain its operation. **6**

3. (a) For an AM broadcast-band Superheterodyne Receiver with RF and IF frequencies of 600 KHz and 455 KHz respectively. **8**
   Determine :–
   (i) Local Oscillator frequency
   (ii) Image frequency
   (iii) Image frequency rejection ratio for a preselector Q of 100.
   (b) Draw the block diagram of SSB generation using phase shift method to generate upper side band. What changes are required to generate lower side band. **12**

4. (a) (i) A 25 MHz carrier is modulated by a 400 Hz audio sinewave. If the carrier voltage is 4 V and maximum deviation is 10 KHz. Write the equation of modulated wave for FM. If the modulating frequency is now changed to 2 KHz, all else remaining constant, write the new equation for FM. **5**
   (ii) Explain Pre-emphasis and De-emphasis. **5**
   (b) Draw the block diagram of Armstrong Frequency Modulation system and explain its working. Illustrate the principle of operation with suitable vector diagram. **10**

5. (a) Explain FDM system with block diagram and waveforms. **10**
   (b) Compare the following :– **10**
   (i) AM and FM
   (ii) Analog and Digital Communication Systems.

6. (a) Draw the block diagram of a PCM system and explain the function of each block. **10**
   (b) State and prove sampling theorem for low pass band limited signals. **10**

7. (a) Draw neat diagram and explain Delta Modulation. What are the limitations of Delta Modulation ? How they can be minimized ? **8**
   (b) Explain the following in relation to Radio Receiver :– **12**
      (i) Selectivity
      (ii) Sensitivity
      (iii) Delayed AGC
      (iv) Double spotting.