S.E. (ETRX) Sem IV (R) 26/05/09

Con. 2588–09. **(REVISED COURSE)** **VR–3768**

(3 Hours) **[Total Marks : 100**

Lib Basic of Analog & Digital Communication System

3 p.m. to 6 p.m

N.B. : (1) Questions No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data wherever **required** and state **clearly**.
(4) Figures to the **right** indicate **full** marks.
(5) Illustrate answers with sketches wherever **required**.

1. Answer any **four** :— **20**
   (a) Define (i) Noise (ii) Signal to noise ratio (iii) Noise Factor (iv) Noise figure (v) Noise temperature.
   (b) State and explain sampling theorem.
   (c) Distinguish between : Narrow band and wide band F.M.
   (d) Write a note on vestigial side band transmission.
   (e) What is companding ? Explain with typical companding curves.

2. (a) What are sources of noise ? Explain in detail. **8**
   (b) Explain with the help of neat circuit diagram and waveforms A.M. generation using plate modulator. What are the advantages of plate modulator over Grid modulator ? **12**

3. (a) An Amplitude modulated waveform has the form **12**
   V_{AM} = [10+5 cos 6000 πt + 4 cos 8000 πt.]. cos 50,000πt.
      (i) Sketch the amplitude spectrum of V_{AM}.
      (ii) What is the modulation index and Bandwidth of A.M. Signal ?
      (iii) Find the power content of each spectral component including the carrier (Assume R = 50 Ω).
      (iv) Find the total power and side band power.
   (b) What are the methods of SSB generation ? Explain any one of them. **8**

4. (a) A 20MHz carrier is modulated by a 400 Hz modulating signal. The carrier voltage is 5V and maximum deviation is 10 KHz. Write down the mathematical expression for F.M. and P.M. waves. If the modulating frequency is increased to 2 KHz keeping everything else constant write down the expression for the F.M. and P.M. waves. **8**
   (b) Explain Indirect method [Armstrong Method] of F.M. generation with the help of block diagram and phasor diagram. **12**

5. (a) Explain with the help of block diagram & waveforms superheterodyne radio receiver. What are the advantages of this receiver over TRF radio receiver ? **10**
   (b) Sketch the circuit and phasor diagram of a phase discriminator and prove that it works as a F.M. demodulator. **10**

6. (a) Explain PAM and PWM generation with the help of block diagram and waveforms. How is PWM demodulated ? **10**
   (b) Draw the block diagram and waveforms of Adeptive delta modulator and explain in detail. What are the advantages of this modulator over delta modulator. **10**

7. Answer any **three** :— **20**

(a) Explain the following in relation to radio receiver.
   (i) Sensitivity (ii) Selectivity (iii) Double spotting
   (iv) Image frequency & its rejection.

(b) Explain PCM with the help of block diagram & waveforms.

(c) Write a note on TDM and FDM.

(d) In respect to the sky wave propagation explain the following terms :—
   (i) Virtual height (iii) Skip distance
   (ii) MUF (iv) Critical frequency.
