S.E. E&TRX sem II Basics of Comm^n Engineering 16| 5106.

Con. 1716-06. TV-7953

(3 Hours) [Total Marks : 100

N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Figures to **right** indicate **full** marks.
(4) Assume any **suitable** data wherever required but justify the **same**.

1. (a) Would it be possible to transmit one intelligence signal in the upper sideband and a different intelligence signal in the lower sideband of an AM signal ? Explain. 4
   (b) Explain with diagram the signal resulting when a binary square-wave signal phase modulates and frequency modulates a carrier. 4
   (c) What type of multiplexing do you think is being used in cable T.V systems to transmit many TV signals on a single cable ? Explain. 4
   (d) Explain the following terms:— 4
   (1) Skip Distance (2) Maximum Usable Distance.
   (e) Explain VSB transmission. 4

2. (a) Explain "Noise Factor" and "Noise Figure". Derive an expression for the Noise Figure of a cascaded amplifier. 10
   (b) The gain of a cascade of 3 two port circuits is g_{01} = 30 dbs, g_{02} = 20 dbs and g_{03} = 40 dbs and noise factors F_2 = 6dbs and F_3 = 12 dbs. The equivalent noise temperature of the first stage is 4 k. Determine the equivalent noise temperature of the cascade. Assume room temperature to be 290 k. 10

3. (a) The output voltage of a transmitter is given by 400 (1+0.4 sin 6280 t) sin 3.14 x 10^7t. This voltage is fed to a load of 600 Ω resistance. Determine:— 10
   (i) Carrier frequency (ii) Modulating frequency (iii) Carrier power
   (iv) Total power out put (v) Peak power output.
   (b) Explain with the help of diagram ISB techniques of transmission along with its receiver. Assume four (4) voice channels. 10

4. (a) State and explain the sampling theorem. Also explain the signal distortion arising because of improper selection of sampling frequency. 10
   (b) Explain with the help of block diagram of adaptive delta modulation (ADM) for generating digital modulated signal. Why it is prefered over delta modulation ? 10

5. (a) Explain the functioning of a super heterodyne A.M. receiver with the help of neat block diagram and waveforms. Why AGC is required in a receiver. 10
   (b) Explain with diagram working of Ratio Detector. 5
   (c) When a superheterodyne receiver is tuned to 555 KHz, its local oscillator provides the mixer with an input at 1010KHz. What is the image frequency ? The antenna of this receiver is connected to the mixer via a tuned circuit whose loaded 'Q' is 40. What will be the rejection ratio of the calculated image frequency ? 5

6. (a) Explain in brief the properties of radio wave. 5
   (b) Explain with diagram Quantization, Quantization error and Non-Uniform Quantization. 10
   (c) Compare PAM, PWM and PPM. 5

7. Write short notes on any **four** :— 20
   (a) PCM
   (b) Squelch Circuit
   (c) Free-Space path loss and fading
   (d) Inter modulation and Harmonic Distortian
   (e) Sensitivity, Selectivity and Double spotting.
