

Unit - V

9. a) Draw and explain the earth station satellite system. Explain the functions of each block.
- b) Compare TDMA and FDMA satellite multiple access format.

OR

10. a) Explain what are transponders? Draw the diagram and explain its functions.
- b) Explain the uplink and downlink link budget calculations in satellite system.

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Roll No

EX - 601**B.E. VI Semester**

Examination, June 2014

Communication Engineering*Time : Three Hours**Maximum Marks : 70*

Note: Attempt only one question from each unit.
Each question carries equal marks.

Unit - I

1. a) Find the Fourier transform of $\sin c$ function given by
 $s(t) = A \sin c(2\omega t)$
Also find the area under signal $s(t)$
- b) Discuss various properties of the auto correlation function of power signals and energy signals.

OR

2. a) What is Dirac Delta function? Discuss various applications of Dirac Delta function. Prove that the Dirac Delta function $\delta(t)$ is a limiting form of the Gaussian pulse.
- b) State and prove the following properties of Fourier transform:
- Duality
 - Convolution
 - Time shifting

Unit - II

3. a) What is Amplitude Modulation? Discuss time domain as well as frequency domain representation of AM wave. Also derive an expression for modulation index of amplitude modulated wave modulated by several sinusoidal signals.
- b) Explain the following :
- Pre-emphasis
 - De-emphasis

OR

4. a) Discuss the following methods of demodulation of AM waves.
- Square law detector
 - Envelope detector
- b) i) Find the frequency deviation (Δf) and carrier frequency that is necessary to provide 75% modulation in the FM broadcast band.
- ii) Repeat for an FM signal serving as the audio portion of a TV broadcast.

Unit - III

5. a) Draw the block diagram of the Tuned Radio Frequency (TRF) receiver and explain the functions of each block.
- b) Discuss Automatic Gain Control (AGC) in amplitude limiter.

OR

6. a) Explain the following.
- Sensitivity
 - Selectivity
 - Image frequency and its regulation
- b) Draw and discuss the block diagram of a simple FM receiver.

Unit - IV

7. a) i) Compare between instantaneous, flat topped and natural sampling schemes.
- ii) Find the Nyquist rate and Nyquist interval for the following signals.

$$A) f(t) = \frac{1}{2\pi} \cos(4000\pi t) \cdot \cos(1000\pi t)$$

$$B) f(t) = \frac{\sin(500\pi t)}{\pi t}$$

- b) Consider an audio signal of the form $s(t) = 3 \cos 500\pi t$
- Find the signal to quantization noise ratio when this is quantized using 10 bit PCM.
 - How many bits are needed to achieve a $(SNR)_q$ of at least 40 dB?

OR

8. a) Explain what is Quantizer? Distinguish between uniform and non-uniform Quantization.
- b) Discuss the noise in FM systems. Derive an expression for Figure of Merit (FOM) for FM system.