DipIETE – ET (OLD SCHEME)

Code: DE12 **Subject: COMMUNICATION ENGINEERING**
Time: 3 Hours **Max. Marks: 100**

DECEMBER 2009

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: **(2×10)**

a. The noise which effects more at high frequencies

(A) Shot noise **(B)** Random noise
(C) Impulse noise **(D)** Transit-time noise

b. VSB is normally used for

(A) HF point to point communication
(B) Monaural broadcasting
(C) TV broadcasting
(D) Stereo broadcasting

c. Frequencies in UHF range normally propagate by means of

(A) ground waves **(B)** sky waves
(C) surface waves **(D)** space waves

d. Indicate the antenna that is not wideband

(A) Discone **(B)** Folded dipole
(C) Helical **(D)** Marconi

e. The most common modulation system used for telegraphy is

(A) FSK **(B)** Two-tone modulation
(C) PCM **(D)** Single tone modulation

f. The modulation system inherently most noise resistant is

(A) SSB **(B)** FM
(C) PPM **(D)** PCM

g. Satellites used for intercontinental communication are known as

(A) ComSat **(B)** DomSat
(C) Marisal **(D)** Intelsat

h. Equalizing pulses in TV are sent during

(A) Horizontal blanking **(B)** Vertical blanking
(C) The serrations **(D)** Horizontal retrace

i. Following modulation scheme requires least bandwidth for transmission

(A) VSB **(B)** SSB
(C) DSB-SC **(D)** NBFM

j. If a signal has highest frequency component of frequency 2 kHz, then the sampling frequency will be

(A) less than 2 kHz **(B)** equal to 2 kHz
(C) more than or equal to 4 kHz **(D)** between 2 and 4 kHz

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. The front end of a Television receiver, having a bandwidth of 7 MHz and operating at a temperature of 27 ^{o}C, consists of an amplifier having a gain of 15 followed by a mixer whose gain is 20. The amplifier has a 300 Ω input resistor and a shot noise equivalent resistance of 500 Ω; for the mixer these values are 2.2 k Ω and 13.5 k Ω, respectively and the mixer load resistance is 470 k Ω. Calculate the R_{eq} (equivalent noise resistance) for this television receiver. **(8)**

b. Define the following:

(i) Noise Figure
(ii) Noise temperature
(iii) Modulation
(iv) Bandwidth **(8)**

Q.3 a. Derive the Power relation in AM and compare different AM schemes based on power, bandwidth and applications. **(8)**

b. Draw and explain the block diagram of AM transmitter. **(8)**

Q.4 a. Explain how carrier is suppressed using balanced modulator circuit. **(8)**

b. Explain how PLL is used for demodulation of FM signals. Give applications of PLL. **(8)**

Q.5 a. Explain the frequency spectrum of FM wave. How bandwidth of a FM wave is decided? Explain. **(8)**

b. What is phase modulation? Compare it with frequency modulation. **(8)**

Q.6 a. Explain the following terms:

(i) Quantization (ii) Companding (iii) Sampling (iv) Frequency Division Multiplexing **(12)**

b. Explain the basic principle of Optical Fiber communication System. **(4)**

Q.7 a. What are the different modes of transmission in waveguides? Define the dominant mode. . **(6)**

b. Give the properties of Tropospheric Scatter Propagation. **(6)**

c. Explain Extraterrestrial Communication. **(4)**

Q.8 a. Explain the working of yagi-uda antenna with its radiation pattern. Also give its applications. **(8)**

b. Explain the working of a monochrome TV receiver with a neat block diagram. **(8)**

Q.9 a. What is the bandwidth requirement in TV system and what modulation schemes are used for audio and video transmission? **(4)**

b. Write short notes on any **THREE** of the following: **(12)**

(i) Geostationary satellite
(ii) Synchronization circuit in TV systems
(iii) Circular waveguides
(iv) Pre-emphasis and De-emphasis circuits