B.TECH.
THEORY EXAMINATION (SEM–VI) 2016-17
COMMUNICATION ENGINEERING

Time : 3 Hours　　　　　　　　　　　　　　　　　　　　　　*Max. Marks : 100*

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1.　**Explain the following:**　　　　　　　　　　　　　　　　　　**10 x 2 = 20**

(a)　An amplifier operating over the frequency range from 18 to 20 MHz has a 10 KΩ input resistor. What is the rms noise voltage at the input to this amplifier if the ambient temperature is 27° C.

(b)　In an FM system if m_f is doubled by halving the modulating frequency, what will be the effect on maximum deviation?

(c)　Explain what is meant by the terms isotropic source & isotropic medium.

(d)　What is interference of Radio waves? What are conditions necessary for it to happen?

(e)　Write the advantages of PCM system.

(f)　Explain the term reflection and Refraction.

(g)　Explain the classification of optical fibers.

(h)　What is the bandwidth required for an FM signal in which the modulating frequency is 2 kHz and the maximum deviation is 10 kHz.

(i)　Define term sensitivity & selectivity with reference to RF amplifier.

(j)　Calculate the critical angle of incidence between two substances with different refractive indices where $n_1 = 1.5$ and $n_2 = 1.46$.

SECTION – B

2.　**Attempt any five of the following questions:**　　　　　　　　**5 x 10 = 50**

(a)　Explain the working of Super heterodyne receiver with the help of block diagram. A certain transmitter radiates 9 kW with the carrier unmodulated, and 10.125 kW when the carrier is sinusoidally modulated. Calculate the modulation index, percent of modulation. If another sine wave, corresponding to 40 percent modulation is transmitted simultaneously, determine the total radiated power.

(b)　Explain the method of generation of SSB-SC Signal using Phase-Shift method. An audio signal $e_m = 10Sin (2\pi*1000t)$ is used to amplitude modulate a carrier $e_c = 20Sin(2\pi*10^4 t)$. Calculate (i) Modulation Index (ii) Sideband Frequencies (iii) Amplitude of each side band (iv) Bandwidth required (v) Transmission Efficiency

(c)　What is Angle Modulation? Derive the equation of Phase Modulated Wave. What is Pre-emphasis & De-emphasis? How SNR is improved by using Pre-emphasis & De-emphasis.

(d)　What is Noise? Explain various types of noise which are external to the communication system. Define Signal to Noise ratio and Noise Figure..

(e)　Define following terms: (i) Quantization error (ii) Differential Pulse Code Modulation (iii) Adaptive Delta Modulation (iv) Pulse Position Modulation

(f)　Explain the method of generation & Coherent detection of FSK Modulation Technique. What is Time Division Multiplexing? Explain with the help of block diagram.

(g)　Why uplink frequency is kept higher than downlink frequency? Explain the major design consideration of earth station in satellite system.

Attempt any two of the following questions: **2 x 15 = 30**

3. Describe Ground wave propagation. What is the angle of tilt? How does it affect field strength at a distance from the transmitter? Explain the following terms connected with sky wave propagation (i) Virtual height (ii) Critical frequency (iii) Skip distance

4. Draw the block diagram of a monochrome television receiver and explain the function and operation of all the blocks. Explain TV raster scanning process.

5. What are the advantages of optical communication over Electrical communication or radio communication?

   A light ray travels from a medium of refractive index $n_1 = 1.5$ to another with refractive index $n_2 = 1.46$. Calculate the critical angle of incidence measured from the normal at the boundary. What will be this angle if the second medium is air?