Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electrical & Electronics Engg.) (OE 2013 Onwards Batch)
(Sem.–6)

ELEMENTS OF COMMUNICATION SYSTEM

Subject Code : BTEEE-OPB
M.Code : 72839

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a. What is the need of modulation ?

b. A single side band contains 1 kW power. How much power is contained in the side bands and how much in the carrier?

c. Write basic difference between low level and high level modulation.

d. Define angle modulation.

e. The maximum frequency deviation in an FM is 10kHz and signal frequency is 10kHz. Find out the bandwidth using Carson's rule and the modulation index.

f. What is FM Capture effect?

g. Define Sensitivity and Fidelity of radio receiver.

h. Define noise triangle.

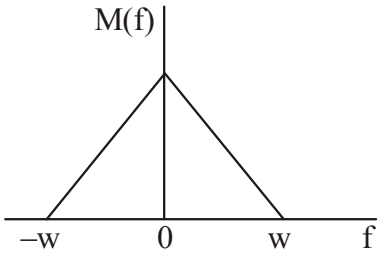
i. For an 8-PSK system, operating with an information bit rate of 24 kbps, determine bandwidth efficiency.

j. Define pulse width modulation.

SECTION-B

2. What is Freqency Shift Keying (FSK) ? Explain FSK bit rate, Baud rate, Bandwidth and frequency spectra of FSK.

3. Consider a message signal m(t) with a spectrum shown below. The message bandwidth w = 1 kHz. This signal is applied to a product modulator, together with a carrier wave $A_c \cos(2\pi f_c t)$producing the DSBSC modulated signal S(t). The modulated signal is next applied to a coherent detector. Assuming perfect synchronism between carrier wave in the modulator and detector. Determine the spectrum of the detector output when (i) =1.25 kHz, (ii) = 0.75 kHz. What is the lowest carrier frequency for which each component of the modulated signal S(t) is uniquely determined by m(t).



Spectrum of the message signal m(t).

FIG.1

4. Discuss the advantage of Pulse Code Modulation (PCM) over the other modulation techniques.

5. Draw circuit diagram and suitable waveform of square law detector used for demodulation of amplitude modulation (AM) wave.

6. What do you mean by multiplexing? With the help of schematic block explain the time division multiplexing (TDM).

SECTION-C

7. Design an Armstrong indirect FM modulator to generate an FM signal with carrier frequency 98.1 MHz and Δf =75 KHz. A NBFM generator of f_{c1} = 100 kHz and Δf = 10 Hz is available. Additionally, a local oscillator (LO) with adjustable frequency between 10 to 11 MHz is readily available for frequency mixing. There are also plenty of frequency doubler, tripler and quintuplers.

8. With the help of the suitable block diagrams and waveforms, explain pulse code modulation (PCM). Explain the coding and decoding techniques used in PCM.

9. Write short notes on :

   a. Superheterodyne receiver

   b. Optical fiber modulation techniques

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.