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iii) FM signal

b) Derive the general expression for PM and FM waves and give suitable comments on the relationship between them.

[(2+2+2)+9]

9. a) Draw the block diagram of a PCM system (transmitter and receiver both).

b) A telephone signal has a maximum frequency of 4 kHz. It is limited in voltage between + 1V to -1V. It is transmitted by using PCM. The required SNR is 40dB. What is the maximum bandwidth required for transmission?

c) A television signal has a bandwidth of 4.5 MHz. This signal is sampled and converted into a PCM signal. Determine the bandwidth of the converted signal.

(5+4+6)

10. a) Explain the working principal of envelop detector.

b) What do you mean by synchronous detection? What is pilot carrier transmission?

c) Determine the power content of the carrier and each of the side bands for an AM signal with m=0.8 and total power of 2500 W.

[5+(2+3)+5]

11. Write short notes on any three of the following:

a) LEO and MEO.

b) Delta modulation.

c) Companding.

d) Manchester coding.

e) PLL.

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CS/B.Tech/Even/CSE/4th Sem/CS-401/2014

2014

Communication Engineering & Coding Theory

Time Alloted : 3 Hours *Full Marks : 70*

The figure in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following: 10×1=10

i) DSB-SC signal can be demodulated using

a. a high pass filter
b. a phase discriminator
c. a PLL
d. an envelope detector.

ii) The length of antenna to transmit a signal must be at least

a. 1/3 wavelength
b. 2/3 wavelength
c. 1/4 wavelength
d. 3/4 wavelength

iii) If the SNR of the signal is increased, then the channel capacity

a. is increased

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b. is decreased
c. remains constant
d. can't be determined

iv) Which of the following gives maximum probability of error?

a. ASK b. PSK
c. FSK d. DPSK

v) Maximum value of modulation index for AM is

a. 0 b. 0.5
c. 1 d. ∞

vi) Quantization occurs in

a. PCM b. TDM
c. FDM d. PWM

vii) The bandwidth required for transmitting 4kHz signal using PCM with 128 quantization level is

a. 8 kHz b. 16kHz
c. 32 kHz d. 28 kHz

viii) The main advantage of PCM system is

a. lower bandwidth b. lower power
c. lower noise d. none of these

ix) In TV telecast, the sound signal is modulated in

a. VSB b. SSB c. AM d. FM

x) Maximum efficiency in AM is

a. 25% b. 50% c. 33% d. 83%

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GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. 3x5=15

2. Compare ASK, FSK and PSK. (5)

3. Explain the coherent and non-coherent detection of BFSK signal. (2+3)

4. Define modulation. Why is modulation needed in a communication system? (2+3)

5. State sampling theorem. What is aliasing? (2.5+2.5)

6. Why do we use VSB in case of picture signal? What is synchronous detection? Is it advantageous than non-coherent detection? Briefly explain. (2+3)

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. 3x15=45

7. a) Briefly explain the term 'entropy'.
   b) A source produces 4 symbols A, B, C and D with probabilities 1/6, 1/3, 1/4, 1/4. Find entropy of the source.
   c) What is meant by channel capacity? How is it dependent on SNR?
   d) What is Cyclic Redundancy Check (CRC) for error detection? (4+4+4+3)

8. a) Considering a sinusoidal modulating signal m(t) and carrier c(t), draw the following wavoforms:
      i) AM signal;
      ii) PM signal;

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