Code No: R05220405 **R05** **Set No. 2**

II B.Tech II Semester Examinations,December 2010
ANALOG COMMUNICATIONS
Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Give the procedure to generate a narrow band FM signal with neat diagram.
   (b) In an FM system, the modulating signal m(t) = 2.4 cos (1000πt) and the frequency deviation is 4.8 kHz. If the amplitude of the modulating signal is now increased to 7.2 V, what is the new deviation? If the amplitude is raised to 10 V while the frequency is dropped to 200 Hz, what is the deviation? Find the modulation index in each case. [8+8]

2. (a) Define and describe pulse position modulation, and explain with waveforms how it is derived from PWM.
   (b) Explain clearly the generation and demodulation of PWM with the help of necessary diagram. [16]

3. A synchronous detection of SSB signal shows phase and frequency discrepancy. Consider$S(t) = \sum_{i=1}^{N} \cos[(\omega_c t)\cos(\omega_i t + \Phi_i) - \sin(\omega_c t)\sin(\omega_i t + \Phi_i)]$is an SSB signal. The signal is multiplied by the locally generated carrier cosω_ct and then passed through a low-pass filter.
   (a) Prove that the modulating signal can be completely recovered if the cut-off frequency of the filter is $f_N < f_o < 2f_c$.
   (b) Determine the recovered signal when the multiplying signal is cos[ω_c + Φ].
   (c) Determine the recovered signal when the multiplying signal is cos[(ω_ct+Δω)t]. Give ΔΦ << Φ_i where $\omega_c = 2\Pi f_c$, $\Delta\omega = 2\prod \Delta f$. [16]

4. (a) With the aid of the block diagram explain TRF receiver. Also explain the basic superheterodyne principle.
   (b) List out the advantages and disadvantages of TRF receiver. [12+4]

5. Considering the modulating and carrier waves as sinusoids, Explain the single tone modulation and demodulation of DSB-SC wave with necessary expressions, waveforms and spectrums and explain how only one side band is necessary for transmission of information. [16]

6. Explain the noise performance of AM reveivers with the help of block diagram.[16]

7. (a) Derive the expression for choice of time constant RC in linear diode detector

(b) A modulating signal is given by m(t) = 2 sin $2\Pi 10^4$t is used to amplitude modulate a carrier given by c(t) = 10 sin $2\Pi 10^6$t .The modulated voltage wave is developed across a 50 Ω load resistor. Calculate

i. total power

ii. the power in one side frequency

iii. the power in the carrier component. [8+8]

8. Explain variable reactance type FM transmitters with the help of block diagram. [16]

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Code No: R05220405 **R05** **Set No. 4**

II B.Tech II Semester Examinations,December 2010
ANALOG COMMUNICATIONS
Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Define and describe pulse position modulation, and explain with waveforms how it is derived from PWM.
   (b) Explain clearly the generation and demodulation of PWM with the help of necessary diagram. [16]

2. (a) Derive the expression for choice of time constant RC in linear diode detector
   (b) A modulating signal is given by m(t) = 2 sin $2\Pi 10^4$t is used to amplitude modulate a carrier given by c(t) = 10 sin $2\Pi 10^6$t .The modulated voltage wave is developed across a 50 Ω load resistor. Calculate
      i. total power
      ii. the power in one side frequency
      iii. the power in the carrier component. [8+8]

3. A synchronous detection of SSB signal shows phase and frequency discrepancy. Consider$S(t) = \sum_{i=1}^{N} \cos[(\omega_c t)\cos(\omega_i t + \Phi_i) - \sin(\omega_c t)\sin(\omega_i t + \Phi_i)]$is an SSB signal. The signal is multiplied by the locally generated carrier cosω_ct and then passed through a low-pass filter.
   (a) Prove that the modulating signal can be completely recovered if the cut-off frequency of the filter is $f_N < f_o < 2f_c$.
   (b) Determine the recovered signal when the multiplying signal is cos[ω_c + Φ].
   (c) Determine the recovered signal when the multiplying signal is cos[(ω_ct+Δω)t]. Give ΔΦ << Φ_i where $\omega_c = 2\Pi f_c$, $\Delta\omega = 2\prod \Delta f$. [16]

4. Explain the noise performance of AM reveivers with the help of block diagram.[16]

5. Explain variable reactance type FM transmitters with the help of block diagram. [16]

6. Considering the modulating and carrier waves as sinusoids, Explain the single tone modulation and demodulation of DSB-SC wave with necessary expressions, waveforms and spectrums and explain how only one side band is necessary for transmission of information. [16]

7. (a) Give the procedure to generate a narrow band FM signal with neat diagram.

(b) In an FM system, the modulating signal m(t) = 2.4 cos (1000πt) and the frequency deviation is 4.8 kHz. If the amplitude of the modulating signal is now increased to 7.2 V, what is the new deviation? If the amplitude is raised to 10 V while the frequency is dropped to 200 Hz, what is the deviation? Find the modulation index in each case. [8+8]

8. (a) With the aid of the block diagram explain TRF receiver. Also explain the basic superheterodyne principle.

(b) List out the advantages and disadvantages of TRF receiver. [12+4]

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Code No: R05220405 **R05** **Set No. 1**

II B.Tech II Semester Examinations,December 2010
ANALOG COMMUNICATIONS
Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain the noise performance of AM reveivers with the help of block diagram.[16]
2. (a) With the aid of the block diagram explain TRF receiver. Also explain the basic superheterodyne principle.
   (b) List out the advantages and disadvantages of TRF receiver. [12+4]
3. Explain variable reactance type FM transmitters with the help of block diagram. [16]
4. (a) Derive the expression for choice of time constant RC in linear diode detector
   (b) A modulating signal is given by m(t) = 2 sin $2\Pi 10^4$t is used to amplitude modulate a carrier given by c(t) = 10 sin $2\Pi 10^6$t .The modulated voltage wave is developed across a 50 Ω load resistor. Calculate
      i. total power
      ii. the power in one side frequency
      iii. the power in the carrier component. [8+8]
5. (a) Give the procedure to generate a narrow band FM signal with neat diagram.
   (b) In an FM system, the modulating signal m(t) = 2.4 cos (1000πt) and the frequency deviation is 4.8 kHz. If the amplitude of the modulating signal is now increased to 7.2 V, what is the new deviation? If the amplitude is raised to 10 V while the frequency is dropped to 200 Hz, what is the deviation? Find the modulation index in each case. [8+8]
6. A synchronous detection of SSB signal shows phase and frequency discrepancy. Consider $S(t) = \sum_{i=1}^{N} \cos[(\omega_c t)\cos(\omega_i t + \Phi_i) - \sin(\omega_c t)\sin(\omega_i t + \Phi_i)]$is an SSB signal. The signal is multiplied by the locally generated carrier cosω_ct and then passed through a low-pass filter.
   (a) Prove that the modulating signal can be completely recovered if the cut-off frequency of the filter is $f_N < f_o < 2f_c$.
   (b) Determine the recovered signal when the multiplying signal is cos[ω_c + Φ].
   (c) Determine the recovered signal when the multiplying signal is cos[(ω_ct+Δω)t]. Give ΔΦ << Φ_i where $\omega_c = 2\Pi f_c$, $\Delta\omega = 2\prod \Delta f$. [16]

7. Considering the modulating and carrier waves as sinusoids, Explain the single tone modulation and demodulation of DSB-SC wave with necessary expressions, waveforms and spectrums and explain how only one side band is necessary for transmission of information. [16]

8. (a) Define and describe pulse position modulation, and explain with waveforms how it is derived from PWM.

   (b) Explain clearly the generation and demodulation of PWM with the help of necessary diagram. [16]

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Code No: R05220405 **R05** **Set No. 3**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. A synchronous detection of SSB signal shows phase and frequency discrepancy. Consider$S(t) = \sum_{i=1}^{N} \cos[(\omega_c t)\cos(\omega_i t + \Phi_i) - \sin(\omega_c t)\sin(\omega_i t + \Phi_i)]$is an SSB signal. The signal is multiplied by the locally generated carrier cosω_ct and then passed through a low-pass filter.
   (a) Prove that the modulating signal can be completely recovered if the cut-off frequency of the filter is $f_N < f_o < 2f_c$.
   (b) Determine the recovered signal when the multiplying signal is cos[ω_c + Φ].
   (c) Determine the recovered signal when the multiplying signal is cos[(ω_ct+$\Delta\omega$)t]. Give $\Delta\Phi << \Phi_i$ where $\omega_c = 2\Pi f_c$, $\Delta\omega = 2\prod \Delta f$. [16]
2. (a) With the aid of the block diagram explain TRF receiver. Also explain the basic superheterodyne principle.
   (b) List out the advantages and disadvantages of TRF receiver. [12+4]
3. Explain the noise performance of AM reveivers with the help of block diagram.[16]
4. (a) Define and describe pulse position modulation, and explain with waveforms how it is derived from PWM.
   (b) Explain clearly the generation and demodulation of PWM with the help of necessary diagram. [16]
5. (a) Derive the expression for choice of time constant RC in linear diode detector
   (b) A modulating signal is given by m(t) = 2 sin $2\Pi 10^4$t is used to amplitude modulate a carrier given by c(t) = 10 sin $2\Pi 10^6$t .The modulated voltage wave is developed across a 50 Ω load resistor. Calculate
      i. total power
      ii. the power in one side frequency
      iii. the power in the carrier component. [8+8]
6. (a) Give the procedure to generate a narrow band FM signal with neat diagram.
   (b) In an FM system, the modulating signal m(t) = 2.4 cos (1000πt) and the frequency deviation is 4.8 kHz. If the amplitude of the modulating signal is now increased to 7.2 V, what is the new deviation? If the amplitude is raised to 10 V while the frequency is dropped to 200 Hz, what is the deviation? Find the modulation index in each case. [8+8]

7. Explain variable reactance type FM transmitters with the help of block diagram. [16]

8. Considering the modulating and carrier waves as sinusoids, Explain the single tone modulation and demodulation of DSB-SC wave with necessary expressions, waveforms and spectrums and explain how only one side band is necessary for transmission of information. [16]

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