Code No: 07A4EC11　　　　　R07　　　　　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. Explain about AM transmitter? Why feedback is used in the AM transmitter? And explain its uses? [16]

2. (a) A carrier $A\cos\varpi_c t$ is modulated by a signal $2\cos10^4.2\pi t + 5\cos10^3 2\pi t + 2\cos10^4.4\pi t$.find the bandwidth of the FM signal using Carson's rule.Assume $K_f=12$kHz/V. also find modulation index?

   (b) Draw the circuit for ratio detector and explain how it is derived from phase discriminator? [8+8]

3. (a) Describe the demodulation of AM wave using square law device?

   (b) Define modulation coefficient and percent modulation? [8+8]

4. An amplitude modulated amplifier provides an output of 106 watts at 100% modulation. The internal loss is 20Watt.

   (a) What is the un modulated carrier power.

   (b) What is the sideband power? [16]

5. (a) What, exactly does a noise limiter do in an AM receiver? How does it do this?

   (b) Describe the differences between FM and AM receivers, bearing in mind the different frequency ranges and bandwidths over which they operate? [8+8]

6. Derive the necessary equations to show the SNR improvement with pre emphasis circuit? [16]

7. How to obtain PWM from PPM. Explain the various components in the block diagram. [16]

8. Describe how single sideband suppressed carrier is used with frequency division multiplexing? [16]

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Code No: 07A4EC11          **R07**          **Set No. 4**

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### 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. In an DSB-SC system the modulating signal is single tone sinusoid $10\cos(2\pi\,10t)$ which modulates a carrier signal $10\cos(2\pi\,1000t)$.Plot the spectrum of the modulated wave? [16]

2. Discuss the generation & demodulation of PWM. [16]

3. (a) Define phase deviation and modulation index?

   (b) Compare the advantages and disadvantages of angle modulation with amplitude modulation? [8+8]

4. Describe the operation of direct FM transmitters? Describe two methods to up convert the frequency of angle modulated waves? [16]

5. A channel has a uniform noise power density spectrum $S_n(\omega)=0.5\times10^{-3}$. A SSB-SC signal with carrier frequency of 200kHz is transmitted over this channel. The modulating signal band limited to 10kHz.the power of the sideband signal is 5kW. The incoming signal at the receiver is filtered through an ideal band pass filter(upper side bands) before it is fed to the demodulator.

   (a) What is the transfer function of this filter at the receiver.

   (b) Find the S/N ratio of demodulator input and output.

   (c) Find and sketch the noise power density spectrum at the demodulator output. [16]

6. (a) Explain what double spotting is and how it arises.

   (b) Describe the general process of frequency changing in a super hetero dyne receiver. [16]

7. Compare the three methods of SSB generation by drawing a table with its outstanding characteristics? [16]

8. One input to an AM modulator is a 500kHz carrier with a peak amplitude of 32V.The second input is a 12-kHz modulating signal whose amplitude is sufficient to provide a 14-Vp change in the amplitude of the envelope. determine the following:

   (a) upper and lower side frequencies.

   (b) modulation coefficient, percent modulation?

   (c) maximum and minimum amplitudes of the envelope.

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(d) draw the output envelope.

(e) draw the output frequency spectrum.                                    [16]

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R07

Set No. 1

**II B.Tech II Semester Examinations,December 2010**
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Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions**
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1. Define pulse amplitude modulation Draw the waveform, and explain the operation.
[16]

2. Explain the principle of operation of Costa's loop? [16]

3. (a) Show that an AM signal can be recovered, irrespective of the value of percentage modulation by using synchronous detection technique?

   (b) What is the maximum modulating signal frequency that can be used with an AM (DSBFC) system with a 30kHz bandwidth? [8+8]

4. A channel has a uniform noise power density spectrum $S_n(\omega)=0.5\times10^{-3}$. A DSB-SC signal with carrier frequency of 200kHz is transmitted over this channel. The modulating signal band limited to 10kHz.the power of the sideband signal is 5kW. The incoming signal at the receiver is filtered through an ideal band pass filter before it is fed to the demodulator.

   (a) What is the transfer function of this filter at the receiver.

   (b) Find the S/N ratio of demodulator input and output.

   (c) Find and sketch the noise power density spectrum at the demodulator output.
   [16]

5. (a) Show that a low pass filter can be used as a discriminator?

   (b) An FM radio link has a frequency deviation of 30kHz.The modulating frequency is 4kHz.calculate the bandwidth needed for the link. What will be the bandwidth if the deviation is reduced to 10 kHz? [8+8]

6. Draw the circuit and explain the generation of SSB-SC wave using the "third" method? [16]

7. What is three point tracking? How do tracking errors arise in the first place? What is the name given to the element that helps to achieve three point tracking? Where is it placed. [16]

8. Write short note on the following:

   (a) AM transmitters

   (b) Armstrong FM transmitters. [8+8]

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Code No: 07A4EC11 | **R07** | **Set No. 3**

## 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) Compare and contrast the performance of various types of frequency demodulators?

   (b) An angle modulated signal is given by $X_c(t) = 5\cos[2\pi(10^6)t + 0.2\cos200\pi t]$. Can you identify whether $X_c(t)$ is a PM or an FM signal?                    [8+8]

2. With the aid of vector diagrams, explain what happens when a carrier is modulated by a single noise frequency?                                                         [16]

3. Describe the operation of a phase locked loop direct FM transmitters?          [16]

4. Using circuit diagrams ,explain the operation of the self excited transistor mixer by the three frequency approach?                                                    [16]

5. (a) Show that if every frequency component of a signal f(t) is shifted by $\pi/2$, the resultant signal is the Hilbert transform of f(t)?

   (b) Draw the circuit and explain the generation of SSB-SC wave using phase shift method?                                                                             [8+8]

6. (a) Sketch the envelope for a maximum positive envelope voltage of 12V and a minimum positive envelope amplitude of 4V,determine the modulation coefficient & percent modulation?

   (b) Describe the demodulation of AM wane using square law device?              [8+8]

7. (a) What is single polarity and double polarity in PAM.

   (b) How is TDM different from FDM.                                             [8+8]

8. The modulating signal f(t) in an DSB-SC system is multiple-tone signal given by f(t)=$E_1\cos\omega_1 t + E_2\cos\omega_2 t + E_3\cos\omega_3 t$. The signal f(t) modulates a carrier $E_c\cos\omega_c t$. Plot the single sided trigonometric spectrum and find the bandwidth of the modulated signal. Assume that $\omega_3 > \omega_2 > \omega_1$ and $E_3 > E_2 > E_1$ .          [16]

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