

Institute of Road and Transport Technology, Erode
Department of Electronics and Communication Engineering
Class/Sem: 2nd Year Computer Science Engg-3rd Semester
Subject: Analog and Digital Communication (CSE)

Two Marks

Unit – 1 Fundamentals of Analog Communication

1. The antenna current of an AM transmitter is 8 A when only carrier is sent, but it increases to 8.96 A when the carrier is modulated by a single tone sinusoid. Find the percentage modulation. (POC,AU-2007)
2. Calculate the bandwidth of commercial FM transmission assuming $\Delta f = 75$ KHz and $f_m = 15$ KHz. (POC,AU-2007)
3. For an unmodulated carrier voltage of 10 V_p and a ± 4 V change in amplitude of the envelope, determine the modulation coefficient and percent modulation. (POC,AU-2008)
4. For an FM modulator with a modulation index $m = 1$, a modulating signal $V_m(t) = V_m \sin(2\pi 1000 t)$, and an unmodulated carrier $V_c(t) = 10 \sin(2\pi 500k t)$, draw the frequency spectrum showing their relative amplitudes. (POC,AU-2008)
5. Draw the frequency spectrum of AM. (POC,AU-2009)
6. A signal of frequency 4 KHz is amplitude modulated by carrier of 100 KHz. Determine the bandwidth of the AM signal. (POC,AU-2009)
7. Define FM. (POC,AU-2009)
8. Define modulation index for FM. (POC,AU-2010)
9. Give the mathematical expression for carrier power and side band power of an amplitude modulated wave. (POC,AU-2010)
10. How FM is generated using PM. (POC,AU-2010)
11. What is phase modulation? Give its mathematical expression. (POC,AU-2010)
12. What is modulation? (POC,AU-2011)
13. What are the major limitations of amplitude modulation? (POC,AU-2011)
14. Define modulation index. (POC,AU-2011)
15. What do you mean by frequency spectrum? (POC,AU-2011)
16. What are the degrees of modulation? (POC,AU-2011)
17. Define carrier swing. (POC,AU-2011)
18. Define modulation index for AM. (POC,AU-2012)
19. What is meant by phase modulation? (POC,AU-2012)
20. Determine the powers of the carrier, upper and lower sidebands for an AM DSBFC with peak unmodulated carrier voltage of $V_c = 20$ V_p and a load resistance $R_L = 20 \Omega$. Assume modulation index 'm' to be 0.6. (ADC, AU-2006).
21. In FM modulation index increases, the required bandwidth also increases. Why? (ADC, AU-2006).
22. Draw the amplitude modulation waveforms with modulation index $m = 1$, $m < 1$ and $m > 1$. (ADC, AU-2008)
23. What are the advantages of SSB-SC modulation? (ADC, AU-2009)
24. The required bandwidth of FM transmission depends upon the modulation index-Justify. (ADC, AU-2009)
25. Draw the frequency spectrum of AM. (ADC,AU-2010)
26. Define phase modulation.(ADC, AU-2010).

27. What is the approximate bandwidth required to transmit a signal at 4 KHz using FM with frequency deviation of 75 KHz. (ADC, AU-2010)
28. What is meant by repetition rate of the AM envelope? (ADC,AU-2010)
29. Describe the upper and lower sidebands. (ADC, AU-2010)
30. Define modulation coefficient and percent modulation. (ADC, AU-2010)
31. Give the relationship between instantaneous carrier phase and modulating signal for PM.(ADC, AU-2010)
32. State Carson's general rule for determining the bandwidth for an angle modulated wave. (ADC,AU-2010)
33. Define Carrier Swing. (ADC, AU-2010)
34. Define high modulation index. (ADC, AU-2010)
35. Distinduish between FM and PM. (ADC, AU-2012)
36. What is the bandwidth need to transmit 4 KHz voice signal using AM? (ADC, AU-2012)
37. Sketch the block diagram for generating FM signal using PM modulator and PM signal using FM modulator.(POC,AU-2007)

Unit -2 Digital Communication

1. Explain MSK. (Minimum Shift Keying). (POC,AU-2009)
2. What is a constellation diagram and how is it used with PSK? (POC,AU-2008,2010)
3. Illustrate binary modulated waveforms ASK and FSK for the bit sequence 1 0 0 1 0 0 1 1. (POC,AU-2007)
4. Show the arrangement for non-coherent detection of FSK binary signal. (POC,AU-2007)
5. Explain Shannon limit for information capacity. (POC,AU-2010) (ADC,AU-2009)
6. The bit stream 1011100011 is to be transmitted using DPSK. What is the encoded sequence? (POC,AU-2010)
7. In a QPSK system, the bit rate of NRZ stream is 10 Mbps and carrier frequency is 1 Ghz. What is the symbol rate of transmission? (POC,AU-2010)
8. Which digital modulation technique gives better error probability? Why? (POC,AU-2010)
9. State the advantages of frequency shift keying. (POC,AU-2011)
10. Define Shannon limit. (POC,AU-2011)
11. What is carrier recovery? (POC,AU-2011,2012)
12. What do you mean by bit rate and baud rate? (POC,AU-2011) (ADC,AU-2006)
13. Find the bandwidth for a 4-PSK signal transmitting at 2000 bps. (POC,AU-2011)
14. Define Debit. (POC,AU-2011)
15. Give any two applications of DPSK. (POC,AU-2012)
16. What are the advantages of BPSK? (ADC,AU-2006) (ADC, AU-2009)
17. What is channel capacity? (ADC,AU-2007)
18. What do you mean by burst error? (ADC, AU-2007)
19. Draw NRZ and RZ signals. (ADC,AU-2007).
20. What is frequency-shift keying (FSK)? (ADC, AU-2008)
21. Draw 8-QAM modulator phasor diagram. (ADC, AU-2008)
22. Define source coding theorem.(ADC,AU-2010)
23. Draw the block diagram of QPSK transmitter. (ADC, AU-2010)
24. Differentiate between PSK from DPSK. (ADC,AU-2010)
25. Define coding efficiency. (ADC, AU-2010)
26. Compare QPSK and DPSK. (ADC, AU-2010)
27. Define QAM and Quad bit. (ADC, AU-2010)
28. Write the difference between PSK and FSK. (ADC, AU-2011)
29. Determine the peak frequency deviation and minimum bandwidth for a binary FSK signal with a mark frequency of 49 Khz and a space frequency of 51 Khz. (ADC, AU-2012)
30. Define Bandwidth efficiency. (ADC, AU-2012)
31. Draw the block diagram of BFSK transmitter. (ADC, AU-2012)

Unit 3 Digital Transmission

1. What is ISI? (POC,AU)
2. Differentiate Base band transmission from band pass transmission. (POC,AU)
3. What is aliasing and its effect? (POC,AU)
4. List down the information provided by the eye pattern regarding the performance of the system. (POC,AU)
5. Explain about the signaling rate of PCM. (POC,AU)
6. Give the necessary condition for slope overload distortion to occur in DM. (POC,AU)
7. Differentiate PCM and DPCM. (POC,AU)
8. State sampling theorem. (POC,AU) (ADC,AU-2007)
9. What is aliasing? (POC,AU)
10. What is meant by quantization noise? (POC,AU) (ADC,AU-2007)
11. What is compander? (POC,AU)
12. How eye pattern is obtained? (POC,AU)
13. What is the significance of eye pattern? (POC,AU)
14. Why do you get slope overload error in Delta modulation? (ADC, AU-2006)
15. How eye pattern helps in measuring ISI? (ADC, AU-2006)
16. State the advantages of Digital Communication over Analog communication. (ADC, AU-2007).
17. Two analog signals $m_1(t)$ and $m_2(t)$ are to be transmitted over a common channel by means of time-division multiplexing. The highest frequency of $m_1(t)$ is 3 KHz and that of $m_2(t)$ is 3.5 KHz. What is the minimum value of the permissible sampling rate? (ADC, AU-2007).
18. What are the two types of noises present in Delta Modulation System? (ADC, AU-2009).
19. Explain why the quantization noise cannot be removed completely in PCM. How do you reduce this noise? (ADC, AU-2009).
20. Compare delta modulation PCM and standard PCM. (ADC,AU-2010)
21. Define natural sampling and flat top sampling. (ADC, AU-2010)
22. What causes ISI in digital transmission? (ADC, AU-2011)
23. What is μ -law companding? (ADC,AU-2011)
24. Determine the Nyquist rate for analog input frequency of (a). 4 KHz (b). 10 KHz. (ADC, AU-2012)
25. Define companding. (ADC, AU-2012)
26. Give one advantage and disadvantage of delta modulation. (ADC, AU-2012)

Unit 4 Data Communications

1. Differentiate: Synchronous and Asynchronous transmission. (ADC,AU-2007)
2. What is error syndrome? (ADC,AU-2007)
3. Which data communications code is the most powerful? Why? (ADC, AU-2011)
4. What do the status signals RPE, RFE and ROR indicate?(ADC, AU-2011)
5. What is the need for data modems? (ADC, AU-2012)
6. Mention the difference between line coding and channel coding. (ADC, AU-2012)
7. Draw the null modem circuit. (ADC, AU-2012)
8. What is meant by fading?(ADC, AU-2012)
9. Mention any two error control codes. (ADC, AU-2012)

Unit 5 Spread Spectrum and Multiple Access Techniques

1. What are the properties of Pseudo noise sequence? (POC,AU-2009) (ADC,AU-2006)
2. Mention any two features of spread spectrum modulation. (POC,AU-2009)
3. Define processing gain. (POC,AU-2008)(ADC, AU-2009).
4. Differentiate between the two common multiple access techniques for wireless communication. (POC,AU-2008)
5. List out the advantages of Direct sequence spread spectrum technique. (POC,AU-2007)
6. Determine the length of the bit sequence spread spectrum system with data sequence bit duration as 4.095ms and PN chip duration is 1 us. (POC,AU-2010)
7. What is the output sequence of a 3 stage PN sequence generator when the initial content of the shift register is 100? (POC,AU-2010)
8. Compare TDMA and CDMA. (POC,AU-2010)
9. List a few multiple access techniques. (POC,AU-2010)
10. State pseudo noise sequence. (POC,AU-2011)
11. What are the differences between multiple access system and multiplexed system? (POC,AU-2011)
12. What is the processing gain of binary PSK? (POC,AU-2011)
13. List out the types of frequency hopping. (POC,AU-2011)
14. What is the use of spread spectrum? (POC,AU-2011) (ADC, AU-2010)
15. State the balance property of random binary sequence. (POC,AU-2011)
16. Mention the significance of spread spectrum modulation. (POC,AU-2011)
17. What is meant by slow frequency hopping? (POC,AU-2012)
18. What are fast and slow frequency hopping? (ADC, AU-2006,AU-2009).
19. Give an example of FH pattern. (ADC, AU-2008)
20. Define Spread Spectrum.(ADC,AU-2010)
21. Why purely random sequence cannot be used as a code in CDMA system. (ADC, AU-2010).
22. Define TDMA and FDMA. (ADC, AU-2010)
23. What do you mean by signaling rate? (ADC, AU-2010)
24. What is the advantage of CDMA? (ADC, AU-2011)
24. Define Jamming Margin. (ADC, AU-2012)
25. Give an example of PN sequence. (ADC, AU-2012)