

**BABA BANDA SINGH BAHADUR
ENGINEERING COLLEGE, FATEHGARH SAHIB**

Subject: ANALOG COMMUNICATION SYSTEM
Semester: IV

Class: ECE

Important Questions

1. Draw and explain the block diagram of analog communication system.
2. What are the different bands available in electromagnetic frequency spectrum and give their applications.
3. Explain the terms bandwidth and information capacity.
4. What do you mean bit rate and baud rate?
5. Define noise. Explain detailed classification of noise. What are the sources of noise?
6. State Hartley law for giving relation between bandwidth, transmission line and information capacity.
7. Explain Shannon's limit for information capacity.
8. Define signal to noise ratio(S/N), noise factor and noise figure.
9. Explain concept of power and energy spectra.
10. Explain different external sources of noise.
11. Define modulation and demodulation. What is the need of modulation?
12. What are the different types of continuous wave and pulse modulation techniques? Define them.
13. Draw modulating signal, carrier signal and amplitude modulated signal, 50% modulated wave, 100 % modulated wave and label properly.
14. Draw and explain frequency spectrum of an AM DSBFC wave.
15. Draw and explain phasor representation of an AM wave.
16. Define coefficient of modulation / modulation index / modulation coefficient in AM.
17. Derive an expression for instantaneous value of Amplitude modulated wave (AM). Sketch the frequency spectrum of an AM wave.
18. Explain voltage spectrum of AM wave.
19. Explain AM time domain analysis and AM power distribution.
20. Explain AM current calculations.
21. Draw and explain circuit diagram and waveforms of single transistor Low level (emitter) AM Modulator.
22. Draw and explain circuit diagram and waveforms high power transistor AM modulator.
23. Draw and explain block diagram of Low level AM DSBFC transmitters.
24. Draw and explain block diagram of High level AM DSBFC transmitters.
25. Draw and explain block diagram of Quadrature amplitude modulation (QAM) modulator and demodulator.
26. What do you mean by AM, FM and PM signals?
27. Define amplitude demodulation.
28. Draw and explain block diagram of AM Receiver.
29. Explain the following characteristics of the radio receiver :-
 - Selective
 - Sensitivity
 - Fidelity
 - Bandwidth improvement
 - Dynamic range
 - Insertion loss

- Noise temperature and equivalent noise temperature
30. Draw and explain block diagram of tuned radio frequency receiver.
 31. Draw and explain block diagram of AM superhetrodyne receiver. What do you mean by heterodyning process. How the Radio frequency(RF)signals are converted into intermediate frequency (IF) signals?
 32. What is the function of the mixer and local oscillator in radio receiver?
 33. Explain receiver tracking and its curve.
 34. What do you mean by IMAGE frequency and image frequency rejection ratio? (IFRR). How it can be avoided.
 35. Draw and explain circuit diagram of Diode mixer and balanced diode mixer.
 36. Draw and explain circuit diagram and waveforms of AM Peak detector / Envelope detector/ second/ shape detector.
 37. What is (AGC) automatic gain control? What are the different types of AGC explain them.
 38. Draw and explain simple AGC circuit.
 39. Explain with diagram AM receiver tracking and tracking curve.
 40. What is single sideband communication system (SSB).
 41. Explain with diagram various types of Single sideband system. Compare the relative power distribution and frequency spectra of conventional AM and Single sideband (SSB) systems. Draw waveform of SSBFC and SSBSC signal. Compare single sideband transmission with conventional AM.
 42. Compare with waveforms following AM transmission systems:-
 - DSBFC
 - DSBSC
 - SSBSC
 43. What are the advantages of Single sideband transmission?
 44. Give mathematical analysis of suppressed carrier AM.
 45. Draw and explain following circuit diagrams for single sideband generation:-
 - Balanced ring modulator.
 - FET balanced modulator.
 - Balanced Bridge modulator.
 46. Draw and explain block diagram of SSB transmitter using :-
 - Filter method
 - Phase Method
 - Third method
 47. Define Quality factor (Q) of a single sideband filter.
 48. Explain with circuit diagram of :-
 - Crystal Lattice filter
 - Mechanical filter
 - Ceramic filter (only short note)
 - Surface Acoustic wave (SAW) filter
 49. Draw and explain block diagram of ISB (independent sideband) transmitter.
 50. Draw and explain block diagram of :-
 - A) Noncoherent BFO SSB receiver
 - B) Coherent SSB BFO receiver
 - C) Single sideband envelope detection receiver.
 51. Define Angle modulation with mathematical expression, its types Direct Frequency modulation (FM) and Direct Phase modulation (PM).
 52. Explain with diagram Angle modulated wave in the frequency domain and time domain.
 53. Give mathematical analysis for explaining difference between FM and PM.
 54. Explain deviation sensitivity and derive expression for PM and FM signal.
 55. Draw FM and PM waveforms.

56. Explain phase deviation and modulation index with expression.
57. Explain frequency deviation and percent modulation.
58. Explain Deviation ratio.
59. Explain FM noise triangle.
60. Draw and explain Pre-emphasis and De- emphasis circuits with diagram. What is their function?
61. Draw and explain circuit diagram of following:-
 - D) Simple direct FM modulator
 - E) JFET Reactance modulator
 - F) Varactor diode direct PM modulator
 - G) Transistor Direct PM modulator
62. Explain with diagram Frequency up conversion by
 - a) Heterodyne method
 - b) Multiplication method
63. Draw and explain block diagram of Crosby Direct Fm transmitter.
64. Draw and explain block diagram of Armstrong indirect FM Transmitter.
65. What are the advantages and disadvantages of Angle modulation over Amplitude modulation?
66. Draw and explain block diagram of double conversion FM receiver.
67. Draw and explain circuit diagram of Balanced slope detector.
68. Draw and explain circuit diagram of Foster seeley discriminator.
69. Draw and explain circuit diagram of Ratio detector.
70. Draw and explain Phase locked loop FM demodulator.
71. Draw and explain Quadrature FM demodulator.
72. What is AFC (automatic frequency control)?
73. Explain how the PM signal is derived from FM.
74. Draw waveforms for the following: -
 - a) Pulse modulation
 - a) Sample pulse
 - b) PWM
 - c) PPM
 - d) PAM
75. What do you mean by pulse modulation and define types of pulse modulation?
76. State Nyquist sampling theorem/ sampling rate.
77. Define Transmission lines. What are the characteristics of electromagnetic waves?
78. Explain with block diagram of Balanced and unbalanced transmission lines.
79. Draw and explain with diagram Coaxial or concentric transmission line.
80. What do you mean by ASK?
81. What do you mean by FSK?
82. What is single tone and multi tone modulation?
83. Differentiate between narrow band and wide band FM signal.
84. Define Carson's rule.
85. What is the effect of increasing modulation index in FM?
86. Why is FM superior to AM in performance?
87. What is VSB?
88. What is Independent sideband (ISB)?
89. State sampling theorem.
90. What is aliasing? What is the effect of aliasing?
91. Define quantizing process.
92. Define quantization error?

93. What is Inter symbol interference?
94. What do you mean by companding? Define compander.
95. Explain Digitizer.
96. Compare Quantization and Sampling operations.
97. Compare the bandwidth efficiency of BPSK and QPSK modulated signals.
98. What is the significance of Q channel and I channel in QPSK modulator?
99. What is the minimum bandwidth ,bit rate ,mark and space frequencies of an FSK system