

JAYA ENGINEERING COLLEGE, THIRUNINRAVUR.

DEPARTMENT OF ECE

EC6402/COMMUNICATION THEORY

16 MARKS POSSIBLE QUESTIONS

UNIT-I

1. Explain the generation of AM signals using Square Law Modulator.
2. Explain the detection of AM signals using Envelope Detector.
3. Explain about balanced modulator to generate DSB-SC signal.
4. Discuss about coherent detector to detect SSB-SC signal
5. Explain about the generation of SSB using Balanced Modulator.
6. Draw the circuit diagram of Ring Modulator and explain with its operation?
7. Discuss the coherent detection of DSB-SC modulated wave with a block diagram of detector and explain.
8. Draw the block diagram for the generation and demodulation of a VSB signal and explain the principle of operation.
9. Write short notes of frequency translation and FDM?
10. Explain the method of generating AM waves using linear time invariant circuits.
11. Explain the method of generating AM waves using Non-Linear circuits.
12. Explain the working of Super heterodyne receiver with its parameters.
13. Describe the generation of SSB wave using phase shift method.
14. With a help of a neat diagram, explain the operation of an envelope detector. Why does negative peak clipping take place?
15. (i) Compare *the* characteristics of DSBFC, DSBSC, SSBFC, SSBSC, VSB schemes.
(ii) Explain *the* concept of FDM with a suitable block diagram.
(iii) Using super heterodyne principle, draw the block diagram of AM radio receiver and briefly explain it.

UNIT-II

1. Explain the indirect method of generation of FM wave and any one method of demodulating an FM wave.
2. Discuss the indirect methods of generating a wide-band FM signal.
3. Draw the circuit diagram of Foster-seeley discriminator and explain its working.

4. Derive an expression for single tone FM wave and Narrowband FM wave?
5. Discuss the working FM using Armstrong method.
6. Derive the expression for the frequency modulated signal. Explain what is meant by narrowband FM and wideband FM using the expression?
7. Explain any two techniques of demodulation of FM.
8. Explain the working of reactance tube modulator and derive an expression to show how the variation of the amplitude of the input signal changes the frequency of the output signal of the modulator.
9. Draw the frequency spectrum of FM and explain. Explain how Varactor diode can be used for frequency modulation. (16)
10. Discuss the indirect method of generating a wide-band FM signal. (16)

UNIT-III

1. Discuss about Central limit theorem in detail.
2. Explain in detail about Ergodic process.
3. Explain in detail about Random process and its Random variables.
4. Write short notes on covariance function.
5. Write short notes on Auto correlation function.
6. With neat diagram Linear filtering of Random process?
7. State and prove four properties of Gaussian process.
8. Explain the following terms mean, correlation, covariance, and ergodicity.

UNIT-IV

1. Discuss the noise performance of AM system using envelope detection.
2. Compare the noise performance of AM and FM systems.
3. Explain the significance of pre-emphasis and de-emphasis in FM systems.
4. Derive the noise power spectral density of the FM demodulation and explain its performance with diagram.
5. Explain the FM threshold effect and capture effect in FM?
6. What is noise temperature? Deduce the expression for effective noise temperature for a cascaded system.

7. What is narrowband noise discuss the properties of the Quadrature components of a narrowband noise.
8. Derive the noise figure for cascade stages.
9. Define noise and explain the types of noise.
10. (i) Derive the representation of narrowband noise in terms of envelope and phase components and list out its properties.
(ii) Consider two amplifiers are connected in cascade. First stage amplifier has gain and noise figure as 10 dB and 2 dB. Second stage has noise figure of 3 dB. Calculate total noise figure.

UNIT-V

1. Discuss source coding theorem, give the advantage and disadvantages of channel coding in detail, and discuss the data compaction.
2. Explain in detail Huffman coding algorithm and compare this with the other types of coding.
3. Explain the properties of entropy and with suitable example, explain the entropy of binary memory less source.
4. Define mutual information. Find the relation between the mutual information and the Joint entropy of the channel input and channel output. Explain the important properties of mutual information.
5. Encode the source symbols with following set of probabilities using Huffman coding.
 $m = \{0.4, 0.2, 0.12, 0.08, 0.08, 0.08, 0.04\}$
6. Derive the channel capacity theorem.
7. Write a note on rate distortion theory.
8. Explain the information capacity theorem.
9. Explain the significance of the entropy $H(X/Y)$ of a communication system where X is the transmitter and Y is the receiver.
10. An event has six possible outcomes with probabilities $1/2, 1/4, 1/8, 1/16, 1/32, 1/32$. Find the entropy of the system.
11. Discuss Source coding theorem, give the advantage and disadvantage of channel coding in detail, and discuss the data compaction.