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Code No: 134AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, February -2024

ANALOG COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) What is the primary purpose of modulation in communication systems? Explain briefly. [2]

b) Define Frequency Division Multiplexing (FDM) and explain its significance in communication. [3]

c) Explain the generation of Double Side Band Suppressed Carrier (DSB-SC) waves. [2]

d) Differentiate between DSB-SC and VSB. [3]

e) Describe the time domain characteristics of single tone modulation in Frequency Modulation (FM). [2]

f) Discuss the power relations in FM waves and their importance in communication. [3]

g) Define and explain the concept of Effective Noise Temperature. [2]

h) Discuss the properties of narrow-band noise and its relevance in communication systems. [3]

i) What are the different types of radio receivers? Briefly explain the characteristics of a Superheterodyne receiver. [2]

j) Compare PAM and PWM. [3]

PART – B

(50 Marks)

2.a) Analyze the advantages and disadvantages of square law modulation. Propose a scenario where square law modulation is preferable.

b) Create a flowchart illustrating the generation of AM waves. Annotate the key components and processes involved. [4+6]

OR

3.a) Describe the demodulation of AM using envelop detector.

b) Evaluate the demodulation techniques for DSB-SC waves, emphasizing the advantages and limitations of each. [5+5]

4.a) Devise a mathematical representation for Vestigial Side Band (VSB) modulation and discuss its practical applications.

b) Design a comparison chart highlighting the key differences between various AM techniques, including DSB-SC, SSB, and VSB. [6+4]

OR

5.a) Assess the time domain characteristics of AM SSB modulation, considering both frequency and phase discrimination methods.

b) Formulate a scenario where VSB modulation is the most suitable, providing technical justifications. [5+5]

6.a) Investigate the spectrum analysis of Sinusoidal Frequency Modulation (FM) waves. Provide insights into narrow-band and wide-band FM.

b) Develop a comprehensive comparison between Direct FM and Indirect FM in terms of generation and practical applications. [5+5]

OR

7.a) Utilize the concept of Balanced Frequency Discriminator to explain the detection of FM waves. Discuss the advantages of using a Phase-Locked Loop (PLL) in FM demodulation.

b) Evaluate the transmission bandwidth of FM waves and its implications in communication system design. [6+4]

8.a) Analyze the impact of noise in DSB and SSB systems. Propose strategies to mitigate noise effects in analog communication systems.

b) Create a flowchart illustrating the threshold effect in Angle Modulation systems. Annotate the key parameters and conditions involved. [6+4]

OR

9.a) Compare resistive noise sources and arbitrary noise sources in terms of their impact on communication systems.

b) Evaluate the significance of pre-emphasis and de-emphasis in noise reduction for communication systems. [5+5]

10.a) Formulate a case study comparing the performance of Tuned Radio Frequency (TRF) receivers and Superheterodyne receivers.

b) Develop a schematic diagram illustrating the amplitude limiting process in an FM receiver. Provide a step-by-step explanation. [4+6]

OR

11.a) Assess the advantages and disadvantages of Pulse Amplitude Modulation (PAM). Propose a real-world application where PAM is most suitable.

b) Design an experiment to demonstrate the generation and demodulation of Pulse Position Modulation (PPM). [5+5]

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