R15

Code No: 125AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January - 2025

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)	Draw the frequency spectrum and mention the bandwidth of AM.	[2]
b)	A 400 W carrier is modulated to a depth of 75%. Calculate the total power in the modulated wave.	[3]
c)	What are the disadvantages of single side band transmission?	[2]
d)	Why VSB system is widely used for TV broadcasting?	[3]
e)	Give two applications of FM signal.	[2]
f)	Explain the concept of Instantaneous frequency.	[3]
g)	Discuss the following: i) noise temperature. ii) noise spectral density.	[2]
h)	Derive the expression for Noise bandwidth.	[3]
i)	List out the advantages of TRF receiver.	[2]
j)	List out the characteristics of a radio receiver.	[3]

PART - B

(50 Marks)

2.a) Explain how an AM signal can be generated using Non-Linear Modulation, and derive the necessary equations.

b) Explain generation of DSB-SC signal with the help of balanced modulator using diodes. [5+5]

OR

3.a) With necessary expressions, explain single-tone AM.

b) What is the necessity of synchronous Carrier in the coherent detection of a Suppressed carrier signal? Explain in detail, with the necessary mathematical expressions. [5+5]

4.a) Derive the time domain expression for an SSB wave.

b) Discuss on Pilot Carrier SSB system with a neat block diagram. [5+5]

OR

5.a) Discuss the phase shift method of generating AM-SSB-SC signal, consisting of the lower side band, with a neat block diagram.

b) Explain the detection of VSBSC signal. [5+5]

6.a) Explain how a frequency modulated signal is generated using varactor diode.
b) Derive the expression for Wide band FM. [5+5]

OR

7.a) Explain the generation of FM using direct method.
b) Explain the functionality of each block of phase shift discriminator. [5+5]

8.a) Derive the Noise figure and Equivalent noise temperature of a cascaded network.
b) Derive the expression of figure of merit for DSBSC system. [5+5]

OR

9.a) What is narrowband noise? Discuss the properties of the quadrature components of a narrowband noise.
b) Derive the expression of figure of merit for SSBSC system. [5+5]

10.a) Explain the generation and de modulation of PAM signals.
b) What is an Amplitude Limiter? Explain its operation with a neat circuit diagram. [5+5]

OR

11.a) Explain the operation of Tuned Radio Frequency (TRF) receiver with the block diagram and mention its disadvantages.
b) How a PPM signal can be generated from a PWM signal? [6+4]

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