Code No: 134AC **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, December - 2019
ANALOG COMMUNICATIONS
(Electronics and Communication Engineering)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) Define modulation and explain the need of it. [2]
b) With a neat diagram explain the basic communication system. [3]
c) List out the advantages and disadvantages of SSB. [2]
d) Explain how to generate a VSB signal. [3]
e) Explain about narrow band FM. [2]
f) What are the different methods of producing FM wave? [3]
g) What is noise and list out various noise sources? [2]
h) Explain about pre-emphasis and de-emphsis. [3]
i) What is receiver and give the classification of receiver? [2]
j) Give the working principle of superhetrodyne receiver. [3]

PART-B

(50 Marks)

2.a) Explain about COSTAS loop with a neat block diagram for demodulating DSB-SC wave.
b) With the help of circuit diagram explain the operation of square law modulator for AM. [5+5]

OR

3.a) Explain the working of envelope detector with a neat circuit diagram.
b) Describe the single tone modulation of SSB. Assume both modulating and carrier signals are sinusoids. [5+5]

4.a) Draw the block diagram of phase shift discriminator and explain the functionality of each block.
b) Calculate the percentage power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to a depth of 100% and 50%. [5+5]

OR

5. What is vestigial side band? Explain the process of generation and detection of VSB modulated wave using a carrier $A_c cos 2\pi f_c t$. [10]

6. Explain the indirect method of generation of FM wave and any one method of demodulating an FM wave. [10]

OR

7. An FM wave with modulation index $\beta = 1$ is transmitted through an ideal band pass filter with mid band frequency fc and bandwidth is 5fm, where fc is the carrier frequency and fm is the frequency of the sinusoidal modulating wave. Determine the amplitude spectrum of the filter output. [10]

8. With the help of a neat diagram explain the noise performance of DSB -SC scheme. [10]

OR

9.a) In a cascade connection of two Two-Port devices the noise figure of first and second stages are 5dB and 15dB respectively. The available power gain of first and second stages are 12dB and 20dB respectively. Find the overall noise figure in dB.

b) Define white noise and plot the power spectral density(PSD) and auto correlation function (ACF) of white noise. [5+5]

10. With a neat diagram, explain each block of super heterodyne receiver. [10]

OR

11. Generate and demodulate the following signals:
a) PAM b) PWM [5+5]

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