Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: EC208
Course Name: ANALOG COMMUNICATION ENGINEERING

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.

                                                       Marks

1 a) Explain thermal noise in amplifiers. Write down the expression for the noise   (8) power and derive the expression for noise voltage.

    b) Derive the spectrum for sinusoidally modulated AM wave and draw the spectrum.   (7)

2 a) A receiver consists of an amplifier which has a noise temperature of 100 K and a   (6) gain of 30 dB. The output of the amplifier is connected to a mixer which has a noise figure of 15dB. Calculate the noise temperature of the mixer and the overall noise temperature of the receiver referred to the input.

    b) Draw the circuit diagram of a BJT collector modulator for AM and explain its   (9) working with waveforms.

3 a) Define noise factor and derive the expression for the output noise power of an   (6) amplifier in terms of noise factor.

    b) The antenna current of an AM transmitter, 30% modulated by a sine wave is 10 A.   (6) It increases to 10.75 A while modulated by another sine wave simultaneously. What is the modulation index due to the second wave?

    c) Mention the need for modulating a signal before transmission.   (3)

PART B
Answer any two full questions, each carries 15 marks.

4 a) Derive the expression for the output of a sinusoidally modulated FM wave. Define   (8) various parameters in the expression.

    b) Explain the operation of a doubly balanced diode ring modulator with the help of a   (7) diagram.

5 a) A sinusoidal modulating waveform of maximum amplitude 4 V and a frequency   (6) of 1 KHz is applied to an FM generator, which has a frequency deviation constant of 5000 Hz/volt. Calculate the maximum frequency deviation, modulation index, and bandwidth.

b) Explain the working of a balanced modulator using FET. Derive the expression for its output voltage. (9)

6 a) What are the drawbacks of a tuned radio frequency (TRF) receiver? With the block diagram of a super-heterodyne receiver, explain that they do not suffer from these drawbacks. (10)

b) What is companded SSB? (5)

PART C
Answer any two full questions, each carries 20 marks.

7 a) With the help of a circuit diagram, explain the working of a JFET reactance modulator. (10)

b) Explain the concept of pre-emphasis and de-emphasis with the help of circuit diagram, and frequency response curves. (10)

8 a) Explain Armstrong method of FM generation. (10)

b) With necessary curves and circuit diagrams, explain the working of FM slope detector and balanced detector. (10)

9 a) With the help of circuit diagram, explain the working of a varactor diode modulator. (10)

b) What are the basic functions of a telephone set? (5)

c) Explain the set of procedures for completing a local telephone call. (5)

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