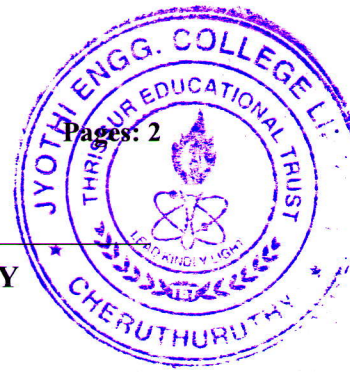E

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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fourth semester B.Tech examinations (S), September 2020

Course Code: EC208
Course Name: ANALOG COMMUNICATION ENGINEERING (EC)

Max. Marks: 100   Duration: 3 Hours

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

1 a) Define the terms signal to noise ratio, noise temperature and noise figure.   (6)

   b) Draw and explain the working of transistorized, collector modulated AM circuit.   (9)

2 a) Write short notes on shot noise and thermal noise. What are the methods to reduce the thermal noise?   (9)

   b) A modulating signal of frequency 5KHz with peak voltage of 6V is used to modulate a carrier frequency of 10MHz with peak voltage of 10V. Determine 1) Modulation index 2) Frequency of LSB and USB 3) Amplitude of LSB and USB 4) Draw the line spectrum.   (6)

3 a) Calculate the thermal noise power available from any resistor at room temperature 290k for a bandwidth 2MHz. Also calculate the corresponding noise voltage, given that R=100Ω.   (6)

   b) Explain the power relation between carrier and sidebands in AM for sinusoidal modulation, after deriving the fundamental voltage equation for AM.   (9)

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

4 a) Explain the Third method of SSB generation with relevant diagram and appropriate mathematical expression.   (8)

   b) Prove that the balanced modulator produces an output consisting of sidebands only with the help of a circuit diagram.   (7)

5 a) Explain with the help of neat sketch the working of super heterodyne receiver. Also how tracking is carried out.   (9)

   b) An FM wave is represented by the equation $e = 10 \sin(5 \times 10^8 t + 4\sin 1250t)$. Find a) Carrier and modulating frequency b) Modulation index and maximum deviation c) Power dissipated by this FM wave in a 5Ω resistor.   (6)

6 a) With the help of a block diagram, pilot carrier SSB transmitter. Why we use pilot carrier? (8)

b) Explain the need for AGC. Draw typical AGC circuit for a super heterodyne receiver and explain its working. (7)

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

7 a) With block diagram explain the FM Stereo broadcasting Transmitter. (10)

b) Describe with block diagram, operation and basic functions of a standard telephone switch. (10)

8 a) Draw the block diagram of an Armstrong indirect FM Transmitter and describe its operation. (10)

b) With supporting equations and block diagram explain how the PM can be obtained by using FM and vice versa. (10)

9 a) Explain how a Foster-Seeley discriminator may be used to detect FM waves, with relevant circuit and phasor diagrams. (10)

b) What is AFC? Explain its function. (4)

c) Describe the difference between the operation of a codeless telephone and a standard telephone. (6)

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