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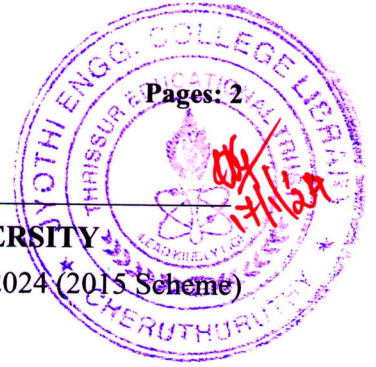
Pages: 2

Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S, FE) / S2 (PT) (S, FE) Examination January 2024 (2015 Scheme)



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 thermal noise along with the expression for noise voltage and noise power. (7)
Also calculate the thermal noise power and corresponding noise voltage available from any resistor at room temperature (290 K) for a bandwidth of 1MHz, given that R is 50Ω.
- b) Explain the working of an envelope detector with neat circuit diagram and waveforms. (8)
- 2 a) The equivalent noise resistance of an amplifier is 300Ω, and the equivalent shot noise current is 5μA. The amplifier is fed from a 150Ω, 10μV rms sinusoidal signal source. Calculate the individual noise voltages at the input and the input signal-to-noise ratio in decibels, taking noise bandwidth as 10MHz. (6)
- b) Explain the block diagram of a high-level AM transmitter. (7)
- c) Define the term over modulation in AM. (2)
- 3 a) Derive the expression for noise factor and the output noise power of an amplifier in terms of noise factor. (6)
- b) A mixer stage has a noise figure of 20dB and is preceded by an amplifier having a noise figure of 9dB and an available power gain of 15dB. Calculate the overall noise figure referred to the input. (5)
- c) Draw the amplitude and frequency spectrum of an AM modulated wave. (4)

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) Explain the working of FET singly balanced modulator with neat circuit diagram. (8)
- b) Describe the working of delayed AGC circuits? (7)
- 5 a) Explain the Weaver's method of generating SSB signals with block diagram and necessary mathematical expressions. (8)

- b) List an advantage and disadvantage each for Amplitude modulation and Frequency modulation. (4)
- c) Define the term image frequency and image frequency rejection ratio in super heterodyne receivers. (3)
- 6 a) An antenna has an impedance of 40Ω . AN unmodulated AM signal produces a current of 4.8A. The modulation is 90%. Calculate a) the carrier power b) the total power and c) the side band power. (6)
- b) Derive the mathematical expressions of sinusoidal FM wave. (6)
- c) Distinguish sensitivity and selectivity of receivers. (3)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Define phase modulation and derive the equivalence between PM and FM. (6)
- b) Explain the working of a varactor diode modulator. (6)
- c) Describe the working of a PLL FM demodulator with neat block diagram. (8)
- 8 a) Explain the working of a Reactance modulator with neat circuit diagram. (8)
- b) Write short notes on pre-emphasis circuit used in FM transmitters. (4)
- c) Explain the basic parts of a cordless telephone set. (8)
- 9 a) Describe the Armstrong method for generating frequency modulated signals. (10)
- b) Explain the balanced slope detector circuit for detecting FM. (10)