

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S, FE) / S2 (PT) (S, FE) Examination May 2023 (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) With the help of a block diagram explain the working of a typical radio transmitter (5)
- b) Explain the terms (i) Thermal noise (ii) Shot noise (5)
- c) A noise source operating at a bandwidth of 10kHz with an internal resistance of 100 Ω is connected to a load resistance of 100 Ω. Find the temperature of the noise source in °C to generate a maximum RMS noise voltage of 125nV across the load resistance (5)
- 2 a) Explain the working of collector modulator for generation of AM (6)
- b) Obtain an expression for sinusoidal AM wave (4)
- c) With the help of a figure show that modulation index $m = \frac{E_{max} - E_{min}}{E_{max} + E_{min}}$ (5)
where E_{max} and E_{min} are peak to peak values of AM wave at its crest and trough respectively.
- 3 a) Derive an expression for total power in an AM wave in terms of carrier power (6)
- b) Explain the concept of Noise Temperature (4)
- c) Explain the terms (i) Partition noise and (ii) Flicker noise (5)

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

- 4 a) Perform mathematical analysis to show that a balanced modulator suppresses carrier frequency (9)
- b) With the help of a block diagram explain the phasing method to generate SSB (6)
- 5 a) Explain the working of double conversion superheterodyne receiver for FM reception (10)
- b) In a particular country spectrum reserved for commercial FM broadcast service is from 88MHz to 108MHz. The bandwidth allowed for a single channel is 200kHz. (5)

What is the maximum number of channels that can be accommodated? Specify the frequency of operation of first three channels

- 6 a) Explain the Third method for generation of SSB (6)
- b) Consider a superheterodyne receiver using high side injection with an RF carrier of 27.04MHz and a 10.645MHz intermediate frequency. Determine (i) Local oscillator frequency (ii) Image frequency (3)
- c) With respect to angle modulation explain the terms (i) Frequency deviation (ii) percent modulation (iii) modulation index (6)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Explain the working of balanced slope detector (7)
- b) What is the role of a limiter circuit in an FM receiver (3)
- c) What are the various steps involved in completing a local telephone call between two subscribers connected to the same telephone switching machine (10)
- 8 a) Explain the working of varactor diode modulator. (6)
- b) Draw the block diagram of an Armstrong indirect FM transmitter and describe its operation (10)
- c) With the help of a block diagram explain how FM may be obtained from PM (4)
- 9 a) Explain the theory behind the working of reactance modulator for generation of FM (10)
- b) Explain the working of cordless telephone (10)
