

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech (Minor) Degree Examination December 2022 (2021 admn.)

Course Code: ECT283**Course Name: ANALOG COMMUNICATION**

Max. Marks: 100

Duration: 3 Hours

PART A**Answer all questions. Each question carries 3 marks**

Marks

- 1 What are the needs of modulation (3)
- 2 Define noise and what are the different types of noise (3)
- 3 Classify the signals into energy , power or neither. (3)
(i) $x(t) = e^{-at} u(t)$ (ii) $x(t) = r(t) - r(t-2)$
- 4 Plot the signal $x(t) = u(t+3) + 2u(t+1) - 2u(t-1) - u(t-3)$. (3)
- 5 Define amplitude modulation and the bandwidth of amplitude modulation (3)
- 6 What are the advantages and disadvantages of AM (3)
- 7 Define frequency modulation and modulation index of frequency modulation (3)
- 8 Distinguish between narrowband FM and wideband FM (3)
- 9 What are the characteristics of radio receivers (3)
- 10 A receiver is tuned to 1 MHz and intermediate frequency is 455kHz and $Q = 100$. Find image rejection ratio (3)

PART B**Answer any one full question from each module. Each question carries 14 marks****Module 1**

- 11 (a) Describe the elements of communication systems (8)
(b) Define noise, noise figure and signal to noise ratio. List out the assumptions of noise calculation in communication system. (6)
- 12 (a) Explain the following i. Thermal noise ii. Flicker noise (7)
(b) How noise temperature related to noise figure and explain flicker noise (7)

Module 2

- 13 (a) i. Give the Parsevals theorem for DTFT. Prove it (4)
ii. distinguish between energy and power signals (3)
(b) State and prove the time shifting and linearity property of Fourier transform (7)

- 14 What is an LTI system. Explain the analysis of LTI system using Fourier transform (8)
- Explain the properties of Fourier transform (6)

Module 3

- 15 (a) Define Amplitude modulation (AM) and explain the concept of AM in detail. (7)
- (b) Obtain a relationship between carrier and side band powers in an AMDSBSC wave and explain how power distribution takes place in AMDSB SC system (7)
- 16 (a) Explain the detector used for demodulation (8)
- (b) Write down the expression for power in an AM wave and find the transmission efficiency of an AM wave (7)

Module 4

- 17 Explain the phase locked loop direct FM transmitter. How PLL makes direct FM signal generation more effective (14)
- 18 Explain various types of FM generation (14)

Module 5

- 19 (a). Explain in detail with the block diagram of superheterodyne receiver (10)
- (b) What is image frequency and what is the function of frequency mixer in superheterodyne receiver (4)
- 20 What is carrier synchronisation and how is it done using PLL (14)
