R20 Regulation *Subject code:* **3P4DB**

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech IV Semester Regular Examinations, July 2022

ANALOG COMMUNICATIONS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Maximum Marks: 70 Date:22.07.2022 Duration: 3 hours

Note:
1. **This question paper contains two parts A and B.**
2. **Part A is compulsory which carries 20 marks. Answer all questions in Part A.**
3. **Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.**
4. **Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 What is the need for modulation?
2 What is the purpose of a ring modulator?
3 Draw the frequency spectrum of SSBSC.
4 What are the applications of AM Systems?
5 Draw the schematic diagram of the Narrowband FM Modulator.
6 Define Zero Crossing Detector
7 The noise figure of a device is 2. So if the input SNR is 37 dB, what would be the output SNR?
8 where do pre-emphasis and de-emphasis use?
9 Write the disadvantage of the Super-heterodyne receiver.
10 Define Sensitivity and Selectivity.

Part-B

Answer All the following questions. (10MX 5=50Marks)

11 A. With the help of a circuit diagram, explain the operation of the square-law diode modulator & demodulator for AM. [5M]

B. An AM transmitter radiates 9kW of power when the carrier is un-modulated and 10.125kW of power when the carrier is sinusoidal modulated. Find the Modulation index & Percentage modulation. Now, if another sine wave Corresponding to 40% modulation is transmitted Simultaneously. Calculate total radiated power. [5M]

OR

12 Draw the frequency spectrum of DSB-SC modulation with necessary mathematical expressions. [10M]

13 A. Describe the VSB in the time domain and then explain any one method of generating a VSB modulated wave. [6M]

B. Why is VSB modulation used in TV broadcasting? Give the advantages of VSB. [4M]

OR

14 A. Explain the Time Domain discrimination method for generating SSB waves. [5M]

B. Discuss Demodulation of SSBSC wave using coherent detection. [5M]

15 A. Derive the expression for single tone frequency modulated signal. [5M]

B. A 100 M Hz carrier is frequency modulated by a sinusoidal signal of amplitude 20V and frequency 100K Hz. The frequency sensitivity of the modulator is 25K Hz/volt. Determine i) frequency deviation ii) modulation index (β) iii) bandwidth [5M]

OR

16 A. Compare the FM with AM.[4M]

B. Explain the indirect method for the generation of FM waves. [6M]

17 A. Write a short note on external noise sources. [5M]

B. Write a short note on noise temperature and noise figures. [5M]

OR

18 Explain the noise performance of the DSB -SC and calculate the figure of merit. [10M]

19 A. List and discuss the factors influencing the choice of the intermediate frequency for a radio receiver. [5M]

B. In a broadcast super-heterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 100. If the IF frequency is 455 kHz, determine the image frequency and its rejection ratio for tuning at 1.1 kHz a station. [5M]

OR

20 Describe the generation and demodulation of PAM with the help of a block diagram. [10M]