

Reg. No.

Question Paper Code

11994

13 JUL 2023

**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023**

Fourth Semester

**Electronics and Communication Engineering**

**20ECPC401 - COMMUNICATION THEORY**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,<br/>K-Level, CO</i> |
|---|-------------------------------|
| 1. Define Modulation and write the advantages of modulation.  | <i>2,K1,CO1</i>               |
| 2. Give the advantages and applications of VSB.   | <i>2,K2,CO1</i>               |
| 3. Why is FM said to be a nonlinear modulation method? List the nonlinear effects in the FM System. | <i>2,K2,CO2</i>               |
| 4. State Carson's rule.   | <i>2,K1,CO2</i>               |
| 5. Define Coherent Detection.   | <i>2,K1,CO3</i>               |
| 6. Compare AM with DSB-SC and SSB-SC.   | <i>2,K1,CO3</i>               |
| 7. When a random process is called as stationary, deterministic and ergodic?                        | <i>2,K2,CO4</i>               |
| 8. Define noise figure and noise equivalent temperature.  | <i>2,K1,CO4</i>               |
| 9. Write about non uniform quantization.  | <i>2,K1,CO6</i>               |
| 10. Formulate the concept of PAM and PCM.   | <i>2,K2,CO6</i>               |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Construct the balanced modulator circuit for generating DSB-SC-AM wave and explain its operation with neat diagram. *13,K2,CO1*
- OR**
- b) Derive the expression for Modulation index, Percentage of modulation and Power distribution of an AM wave. *13,K2,CO1*
12. a) Derive the expression for wide band FM in terms of Bessel functions. *13,K2,CO2*
- OR**
- b) What are the methods of FM generation and explain an indirect method to generate a FM signal. *13,K2,CO2*
13. a) Explain the Foster Seeley FM discriminator with a suitable diagram. *13,K2,CO3*
- OR**
- b) Classify the methods and describe the demodulation of DSB SC by Costas Loop and Coherent detection. *13,K2,CO3*

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

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14. a) Describe in detail of different noise sources and its effect in real time scenario. 13,K2,CO4

**OR**

- b) (i) Write short notes on Shot noise and Thermal noise. 7,K2,CO4  
(ii) For ergodic process show that mean of the time average is equal to ensemble mean. 6,K2,CO4

15. a) Propose the ideas about Uniform Quantization and its types. 13,K2,CO6

**OR**

- b) Distinguish various pulse modulation techniques with necessary diagrams. 13,K2,CO6

**PART - C (1 × 15 = 15 Marks)**

16. a) Explain the noise performance of AM receiver and derive the figure of merit for Envelope detector and coherent detector. 15,K2,CO5

**OR**

- b) Explain narrow band noise. Show that a narrowband noise  $n(t)$  can be represented in terms of its in phase and quadrature phase components. 15,K2,CO5