

Reg. No.

Question Paper Code

21346

**M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022**

First Semester

**M.E. - Communication Systems**

**20PCOEL102 - DIGITAL COMMUNICATION RECEIVERS**

(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 norm of a signal.  | 2,K1,CO1                      |
| 2. Define decision rule for Maximum likelihood detection.                          | 2,K1,CO2                      |
| 3. Define Coherence time.  | 2,K1,CO3                      |
| 4. Indicate the advantage of diversity technique.                                  | 2,K2,CO3                      |
| 5. State Frequency Diversity.  | 2,K1,CO4                      |
| 6. State the characteristics of Nakagami Channel distribution.                     | 2,K1,CO4                      |
| 7. Explain the application of PLL in carrier phase recovery.                       | 2,K2,CO5                      |
| 8. Illustrate the benefits of joint estimation of carrier phase and symbol timing. | 2,K2,CO5                      |
| 9. Explain the concept of constant-modulus.  | 2,K2,CO6                      |
| 10. Indicate the matrix form of LMS Algorithm.                                     | 2,K2,CO6                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Describe the power density spectrum of binary CPFSK. 13,K2,CO1
- OR**
- b) Explain in detail about the memory less modulation methods. 13,K2,CO1
12. a) Summarize the performance of M-ary orthogonal signalling with diversity. 13,K2,CO3
- OR**
- b) Illustrate the performance of square-law detected M=4 orthogonal signals as a function of diversity. 13,K2,CO3
13. a) Describe the probability of error for Soft-Decision Decoding Linear block codes. 13,K2,CO4

**OR**

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

**21346**



b) Explain probability of a bit error for DPSK with diversity for Rayleigh fading. *13,K2,CO4*

14. a) Describe the carrier recovery for M-PSK using a decision-feedback PLL. *13,K2,CO5*

**OR**

b) Illustrate the usage of Non-Decision-directed loop to obtain phase estimate. *13,K2,CO5*

15. a) List the applications of steepest-descent algorithm. *13,K2,CO6*

**OR**

b) Explain Stochastic gradient algorithm for blind equalization. *13,K2,CO6*

**PART - C (1 × 15 = 15 Marks)**

16. a) Describe the energy density spectrum of raised cosine pulse. *15,K2,CO2*

**OR**

b) Determine the basis function  $f(t)$  and the output of the correlation type demodulator of an M-ary baseband PAM signal set in which the basic pulse shape  $g(t)$  is rectangular. *15,K2,CO2*