
	Pimpri Chinchwad Education Trust's Pimpri Chinchwad College of Engineering & Research Ravet, Pune IQAC PCCOER	
Academic Year: 2024 – 25	Digital Communication Question Bank	Term: I

Unit-I: Random Processes and Noise

1. Explain the following terms with mathematical expressions:
 - i) Mean
 - ii) Autocorrelation function
 - iii) Cross-correlation function
 - iv) Auto covariance function
2. With the help of mathematical expression explain stationary random process, non-stationary random process & wide sense stationary processes and Ergodic processes.
3. Show that the total normalized noise power can be obtained by superposition of the powers of individual noise components.
4. What is narrowband noise? Explain generation of narrowband noise from its in-phase & quadrature components.
5. The random variable X has a uniform distribution over a Find mean and mean square value for the random process $V(t) = 6$.
6. A random process is defined as $X(t) =$ where is uniformly distributed random variable in the range $(-, +)$. Show that the given random process is a wide sense stationary process.

Unit-II: Digital Modulation-I

1. With the help of block diagram and waveforms, explain the generation of coherent BFSK.
2. Compare BPSK, BFSK and MPSK with respect to following parameters
 - i) Mathematical Expression
 - ii) Bits per symbol
 - iii) Bandwidth
 - iv) Probability of error

- v) Euclidean distance
- vi) Symbol Duration
- vii) Constellation diagram
- viii) Applications

3. In a QPSK system, bit rate of NRZ stream is 10 Mbps and carrier frequency is 1 GHz. Find symbol rate of transmission and bandwidth requirement of channel. Sketch the PSD of QPSK signal.
4. Binary data is transmitted using PSK at a rate 5 Mbps over RF link having bandwidth 10 MHz. Determine signal power required at receiver input so that error probability is less than or equal to $Q(3.71)$.
5. Explain with neat diagram BPSK transmitter and receiver. Derive an expression for error probability of BPSK in presence of AWGN channel.
6. Give mathematical representation of QPSK signal. Draw the signal space diagram of QPSK signal. Write the expression of all message points in the diagram.