Digital Communication (ETEC-303), V Sem.

Assignment 1, Unit-II

Aug-Dec’21

Q 1. Given Y = Cos X, where random variable X is uniformly distributed in the interval (-π,π). Find pdf and mean of Y.

Q 2. A random variable X has pdf = ke-x for 1≤ x ≤ ∞ and zero otherwise. Find the value of k and P(0≤x≤2).

Q 3. The joint PDF of R.V’s X and Y is given by

p(x,y) = ¼ e –x-y for x and y ranging from -∞ to ∞

1. Find whether X and Y are statistically independent or not.
2. Calculate total probability for x ≤ 1 and y ≤ 0.

Q 4. X(t) = A Cos (wt +θ). Θ is uniformly distributed over –π to π. Find whether X(t) is a random process or not.

Q 5. Find out CDF of Gaussian Random Variable in terms of error function.

Q 6. Find the constant C such that the function f(x) = C(x-1) for 1<x<4 and zero otherwise is a density function. Also find P(2<x<3).

Q 7. For random variables *X* and *Y*, show that

(a) *V ar*[*X* + *Y* ] = *V ar*[*X*] + *V ar*[*Y* ]

(b) *V ar*[*X - Y* ] = *V ar*[*X*] + *V ar*[*Y* ]

(c) *V ar*[*kX*] = *k*2*V ar*[*X*],

where *k* is a constant.

Q 8. For a random process *X*(*t*), State & prove properties of Autocorrelation function, *RX*(*T* ).