

13. a) Show that the random process $x(t) = A \cos(\omega t + \Phi)$ is wide sense stationary if A and ω are constant and Φ is uniformly distributed random variable over the interval $[0, 2\pi]$. 13,K3,CO3

OR

- b) Let $X(t) = A \cos(\omega t + \Phi)$ and $Y(t) = A \sin(\omega t + \Phi)$, where A and ω are constants and Φ is a uniform random variables $[0, 2\pi]$. Solve the cross correlation of $x(t)$ and $y(t)$. 13,K3,CO3

14. a) (i) Explain the operation of pre emphasis & de emphasis in FM in communication system? 7,K2,CO4

- (ii) Write in detail about FM threshold effect. 6,K2,CO4

OR

- b) (i) Explain about Thermal noise with Power spectral density. 7,K2,CO4

- (ii) Discuss in detail about the narrowband noise and analyze the properties of in-phase and quadrature components of narrow band noise. 6,K2,CO4

15. a) Explain the concept of low pass sampling, Aliasing & signal reconstruction. 13,K2,CO6

OR

- b) Explain in detail about
(i) FDM 7,K2,CO6

- (ii) TDM. 6,K2,CO6

PART - C (1 × 15 = 15 Marks)

16. a) Obtain the expression for figure of merit of DSB-SC receiver using coherent detection. 15,K2,CO4

OR

- b) Derive the Power Spectral Density of in-phase and quadrature phase noise of narrow band noise. Find the PDF of sine wave pulse noise. 15,K2,CO4