



R17 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 1P3DD

B.Tech II Year I Semester Supplementary Examinations, February 2021

SIGNALS AND STOCHASTIC PROCESS

(Electronics and Communication Engineering)

Maximum Marks: 70

Date: 26.02.2021 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Check whether $x(t) = A \cos \omega t$ is energy or power signal
- 2 Prove that any LTI system is characterized by impulse response
- 3 Find the Fourier series coefficient of $x(t) = \cos 2\omega t + \cos 4\omega t$
- 4 What is aliasing? How can it be avoided?
- 5 Find the inverse Laplace Transform of $X(S) = 1/(s+2)$ where $\text{Re}(S) > -2$
- 6 Check whether the given system is Causal and Stable $H(Z) = 1/(Z-2)(Z-1)$ where $|Z| > 1$
- 7 What is ergodic process?
- 8 State the properties of auto correlation
- 9 State the relationship between autocorrelation and power spectral density
- 10 Define cross power spectrum

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 Check whether the following systems
(i) $d/dt (y(t)) + t y(t) = x(t)$ (ii) $y[n] = x[n] \cos \omega n$ are 1) Static or Dynamic (2) Linear or non linear (3) Time invariant or variant (4) causal or non causal (5) stable or unstable. (10M)

OR

- 12 Explain about analogy between vectors and signals in terms of orthogonality. (10M)

13 Determine the Fourier series coefficients of Half wave rectified wave. (10M)

OR

14 State and prove sampling theorem for band limited signals. (10M)

15 Find the Z Transform of

(i) $(1/5)^n \sin \omega n$ (6M) (ii) $(2/3)^n \cos \omega n$ (4M)

OR

16 Find the Laplace Transform of (i) $x(t) = \exp(-2t)u(t)$ (ii) $x(t) = \exp(-2t)u(-t)$

(iii) $x(t) = \exp(2t)u(t)$ (iv) $x(t) = \exp(2t)u(-t)$ with necessary ROC (10M)

17 Explain Auto-correlation function and prove any four properties. (10M)

OR

18 Explain the stationary process in detail. (10M)

19 State and prove Wiener Khintchine relation. (10M)

OR

20 Explain the process of finding the frequency of random signal in detail with necessary equations (10M)