



Regulation 18

Subject code: 2P3DD

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech III Semester Supplementary Examinations, July 2022

## Signals & Systems

(Electronics and Communication Engineering)

Maximum Marks: 70

Date: 27.07.2022

Duration: 3 Hours

### Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

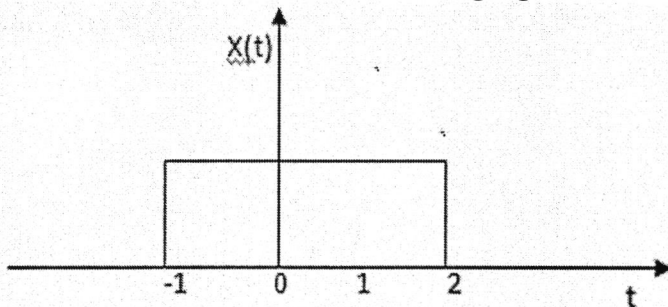
- 1 List out conditions to be power signal, with an example.
- 2 What are the Dirichlet's conditions for existence of Fourier Series.
- 3 What is frequency spectrum?
- 4 What are the effects of sampling rate?
- 5 Does the impulse response of a nonlinear system characterize the system?
- 6 Define transfer function of an LTI system
- 7 Define Energy Spectral Density
- 8 State Parseval's power theorem
- 9 State final value theorem of the Laplace transform.
- 10 Determine Z transform of  $x(n) = \{1, 2, 4, 2\}$

### Part-B

Answer all the question

(10MX 5=50Marks)

- 11 a) Develop the expression for mean square error when a function is approximated in set of mutually orthogonal functions.  
b) Define a signal. State any four operations on signal. [ 5+5 ]  
OR
- 12 Discuss about wave symmetry of Fourier Series in detail. [10]
- 13 Find the Fourier Transform of following signal. [ 10 ]



OR

- 14 With the help of graphical example analyze sampling theorem for low pass signals. [10]
- 15 Check whether the following system  $y(t) = t^2x(t) + x(t-4)$  is [10]M  
(a) static or dynamic (b) linear or non-linear  
(c) causal or non-causal (d) time variant or invariant (e) Stability

OR

- 16 Explain in detail about ideal filter characteristics of a linear system [10]
- 17 a) Write short notes on Power Spectral Density. [ 5+5]  
b) State & prove properties of Auto-correlation of energy signals.

OR

- 18 Explain about cross power spectrum density and its properties with proofs(any three properties). [10]
- 19 a) What is ROC? Discuss about ROCs of various classes of signals.  
b) Prove that the signals  $x(t)=e^{-at}u(t)$  and  $x(t)=-e^{-at}u(-t)$  have the same  $X(s)$  and differ only in ROC. [5+5]

OR

- 20 a) Solve the z-transform and ROC of the following sequences  
i)  $x[n]=[4(5^n)-3(4^n)] u(n)$  ii)  $(1/3)^n [u(-n)-u(n-8)]$   
b) Compare Laplace transform and Z transform. [5+5]