R18

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations February-2022
SIGNALS & SYSTEMS
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 60

PART-A
(Answer all the Questions **5 x 2 = 10** Marks)

1	a	How are systems classified?	2M
	b	What are the Merits of Fourier Transform?	2M
	c	What is anti-aliasing filter?	2M
	d	What are the properties of cross correlation for energy signals.	2M
	e	What is the Z-transform of unit step signal?	2M

PART-B
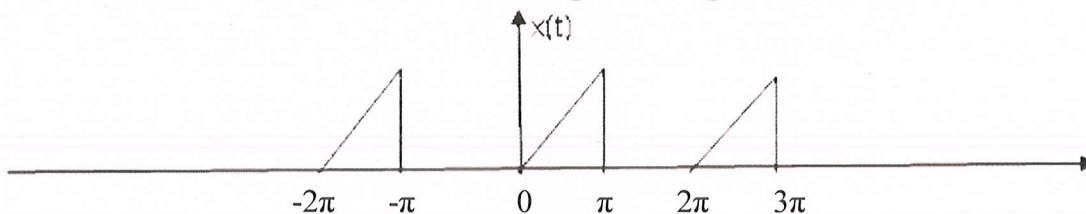(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2 a Find which of the signals are causal or non-causal.   5M
   (i) $x(t)= e^{2t} u(t-1)$ (ii) $x(t)=3$ sinc 2t   (iii) $x(n)=u(n+4)-u(n-2)$ (iv) $x(t)=u(-n)$

   b Sketch the following signals   5M
   (i) $2 u(t+2) - 2 u(t-3)$ (ii) $u(t+4) u(-t+4)$ (iii) $r(t)-r(t-1)-r(t-3)-r(t-4)$ (iv) $\pi(t-2)$

OR

3 What are the basic operations on signals? Illustrate with an example.   10M

UNIT-II

4 Find the trigonometric Fourier series for the periodic signal x(t) shown in below   10M

OR

5 State and Prove the properties of Continuous time Fourier transform?   10M

UNIT-III

6 Consider a stable LTI system that is characterized by the differential equation   10M
   $d^2y(t)/dt^2+4dy(t)/dt+3y(t)= dx(t)/dt+2x(t)$ find the response for an input $x(t)=e^{-t} u(t)$.

OR

7 a Consider a stable LTI System characterized by the differential equation   6M
   $dy(t)/dt+2y(t)=x(t)$, Find its impulse response.

   b Find the Nyquist Rate and Nyquist Interval of the following signals.   4M
   (i)$x(t)=1+\cos 2000 \pi t + \sin 4000 \pi t$ (ii) $x(t)=10 \sin 40\pi t \cos 300\pi t$

UNIT-IV

8 a Find the autocorrelation of the signal $x(t)= a \sin (\omega_0 t +\theta)$.   6M

   b Distinguish the ESD and PSD.   4M

OR

9   Explain the extraction of a signal from noise by filtering   **10M**

UNIT-V

10   a   State and prove initial and final value theorems of Z-transform?   **5M**

      b   State and prove time differentiation and time integration property of Laplace   **5M**
          transform

OR

11   a   Find the Laplace transforms and region for the following signals   **5M**

          (i)$x(t)=e^{-5t}u(t-1)$ (ii)$x(t)=e^{2t}\sin 2t$ for $t\le 0$ (iii) $x(t)=t\,e^{-2|t|}$

      b   Find the Laplace transform of the signal $x(t)= e^{-at}u(t) - e^{-bt}u(-t)$ and also find its   **5M**
          ROC

<p align="center">***END***</p>