Hall	Ticket	Num	ber:

Code No. : 22315

Max. Marks: 70

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD B.E. (E.C.E.) II Year II-Semester Main & Backlog Examinations, May-2017

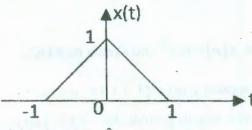
Signal Analysis and Transform Techniques

Time: 3 hours

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A $(10 \times 2 = 20 \text{ Marks})$

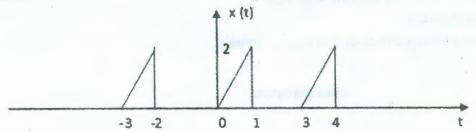
1. Find whether the given signal is power signal or energy signal.



- 2. Find the Fourier series of the signal $\cos^2(\omega_0 t)$.
- 3. Write the condition for existence of Fourier transform.
- 4. Draw the magnitude and phase response of Distortion less system.
- 5. Define ROC of continuous and discrete signals.
- 6. Determine the Initial and final values of continuous time impulse signal.
- 7. Determine DTFT of the signal $x(n) = -4u(n-3) + \delta(n+3)$.
- 8. Find Z-transform of the signal x(n) = 0.3u(n-1) and sketch its ROC.
- 9. Determine autocorrelation of the signal $x(n) = \delta(n)$.
- 10. Distinguish between convolution and correlation integrals.

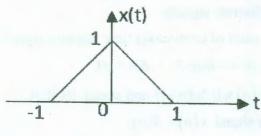
Part-B (5 × 10 = 50 Marks) (All bits carry equal marks)

- 11. a) In case of signals what does the Orthogonality imply? If x_e(t) and x_o(t) are respectively the even and odd parts of a signal x(t), show that they are orthogonal over the interval -T to T for any T.
 - b) For the given periodic signal find exponential Fourier series and draw the magnitude spectrum.

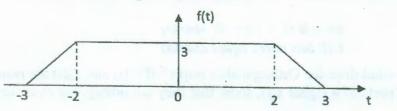


- 12. a) State and prove the time shifting and Convolution in time domain properties of Continuous time Fourier Transform.
 - b) Define step response. Determine the unit step response of an LTI system with impulse response $h(t) = e^{-2t} u(t-2)$.

- 13. a) If x(s) = (s² + 6s +7) / (s² + 3s +2) ROC Re(s)≤1, is the Laplace transform of x(t), obtain the inverse Laplace transform.
 - b) Consider an LTI system whose response to the input $x(t) = [2e^{-t} e^{-3t}] u(t)$ is $y(t) = [3e^{-2t} 3e^{-4t}] u(t)$. Determine the Transfer function and Impulse response of the system.
- 14. a) Find DTFT of the sequence x (n), where
 - $x (n) = 2^{n} \quad 0 \le n \le 3$ $= 1 2^{n} \quad 4 \le n \le 7$ $= 0 \quad \text{otherwise}$
 - b) Find Z- transform of the signal $x(n) = 0.3^{|n|}$ and sketch its ROC.
- 15. a) Find correlation between two signals $x_1(n) = \{1 \ 0 \ 3 \ 4 \ 6\}$ and $x_2(n) = \{2 \ 3 \ 4\}$.
 - b) Find convolution between the two signals graphically x(t) = [u(t) 2u(t-1) + u(t-2)]and $h(t) = 2e^{-t}u(t)$.
- 16. a) A triangular pulse is shown in the figure below, sketch x(-3t+2).



b) Find Fourier transform of the signal shown below:



- 17. Write short notes on any *two* of the following:
 - a) Properties of ROC for discrete time signals
 - b) Sampling theorem
 - c) Properties of cross correlation of energy signals.

ଔଔଔଷ୍ଟାରାର