Exam.Code:0927
Sub. Code: 33642

2125

B.E. (Electronics and Communication Engineering)

Third Semester

EC-302: Signals and Systems

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section. Use of scientific calculator is allowed.

x-x-x

Q.1. Attempt the following questions: -

(a) What is aliasing in the context of signal sampling? (2)

(b) What is the Zero-State Response (ZSR) of a system? (2)

(c) State the frequency shifting property of the Fourier Transform. (2)

(d) Define even and odd signal? (2)

(e) Explain the relation between Laplace transform and Fourier transform. (2)

Section - A

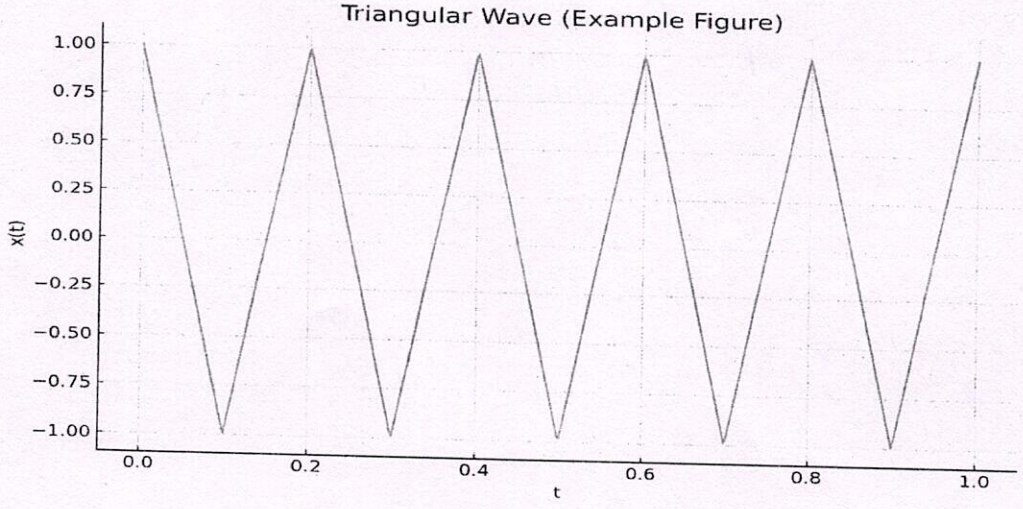
Q.2. (a) Explain Energy and Power signals , Time variant and Time invariant signals each with One example (5)

(b) Draw r(t-1), r(-t+3), r(-2t-1) and r(t+1)-r(t-1), where r(t) is a ramp signal. (5)

Q.3 (a) Explain LTI system and its properties. (5)

(b) Compute the convolution integral of $x(t) = u(t-4)$ & $h(t) = e^{-2t}\, u(t)$. (5)

Q.4 (a) Find the trigonometric Fourier series for the periodic signal f(t) shown in the figure below.



(5)

(b) Explain Sampling theorem with the proper mathematical proof. (5)

P.T.O.

Section - B

Q. 5 (a) Determine Laplace Transform and ROC of $x(t)=\cos(4t)e^{-3t}u(t)$. (5)

(b) Compute inverse Laplace of $X(s)= (2s+10)/(s^2+6s+25)$. (5)

Q.6 (a) Compute inverse Z-Transform of $X(z)= (z)/(z-0.4)^2$. (5)

(b) What is State transition matrix and explain its properties. (5)

Q.7 (a) Find Z-Transform and ROC of $x[n]=n(0.5)^n u[n]$. (5)

(b) Derive the following Z Transform Properties: (5)

(i) Parseval's Theorem (ii) Initial and Final Value theorem

x-x-x