SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

AN AUTONOMOUS INSTITUTION

Accredited AICTE and Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

B.E. – Electronics and Communication Engineering

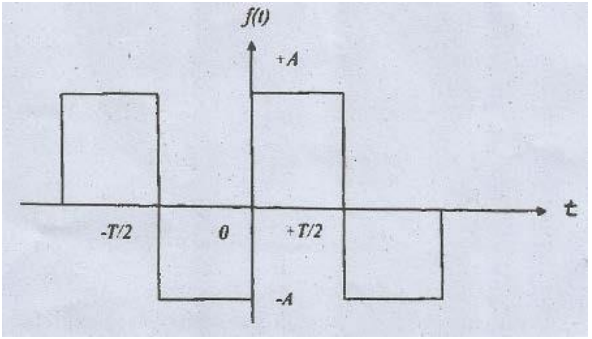
23ECT201 & Signals and Systems

UNIT II - FOURIER AND LAPLACE ANALYSIS OF CONTINUOUS TIME SIGNALS

QUESTION BANK

PART - B

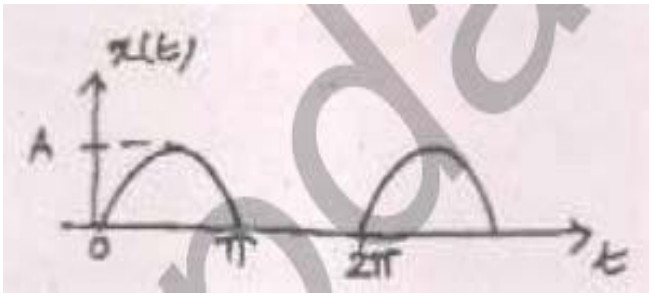
1. Find the exponential Fourier series of the waveform. (10) (Nov/Dec 2013)



(or)

Determine the Fourier series representation of the half wave rectifier output shown:

(8) (Apr/May 2013)

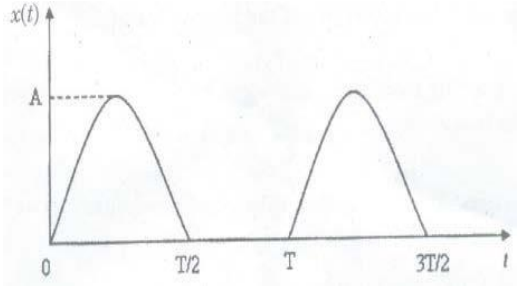


(or)

State Dirichlet's conditions. Also state its importance. (4) (Nov/Dec 2012)

(or)

Obtain the trigonometric Fourier series for the half wave rectified sine wave given below:



(12) (Nov/Dec 2012)

(or)

Find the complex exponential Fourier series coefficient of x(t) = sin 3πt + 2 cos 4πt

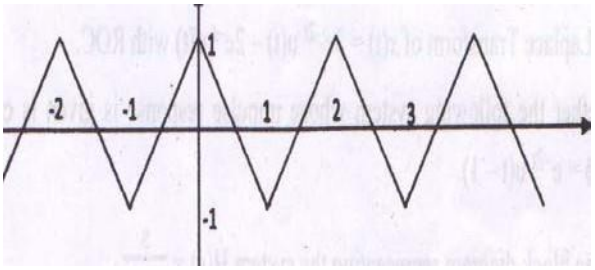
(8) (Apr/May 2012)

(or)

Find the fourier series coefficients of the following signal. (16) (Nov/Dec 2014)

(or)

Obtain the fourier series coefficients and plot the spectrum for the given waveform. (16) (Apr/May2016)



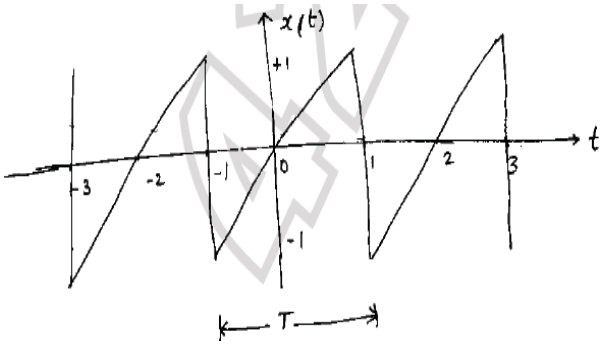
(or)

Determine the complex exponential Fourier series representation for the following signals:

(a) $x(t) = \cos(\omega_0 t)$
(b) $x(t) = \sin^2 t$
(c) $x(n) = \cos(6n\pi/17 + \pi/3)$
(d) $x(n) = 2\sin(14n\pi/19) + \cos(10n\pi/19) + 1$ (16) (Nov/Dec 2010)

(or)

Find trigonometric Fourier series for periodic signal x(t) shown below:



(10) (Apr/May 2010)

(or)

Determine the fourier series expansion for the periodic ramp signal with unit amplitude and a period T. (10) (Apr/May 2015)

(or)

Explain the Fourier spectrum of a periodic signal x(t). (6) (Apr/May 2010)

2. Find the Fourier transform of the signal $x(t) = e^{-a|t|}$. (6) (Nov/Dec 2013)

(or)

Find the Fourier transform of the signal $x(t) = te^{-a|t|}\,u(t)$. (6) (Apr/May 2015)

(or)

State and prove Parseval's theorem of Fourier transform. (6) (Apr/May 2013)

(or)

Find the Fourier transform for double exponential pulse whose function is given by $x(t) = e^{-2|t|}$. Also draw its amplitude and phase spectrum. (8) (Nov/Dec 2012)

(or)

Find the spectrum of $x(t) = e^{-2|t|}$.Plot the spectrum of the signal. (16) (Nov/Dec 2014)

(or)

From basic formula, determine the Fourier transform of the given signals. Obtain the magnitude and phase spectra of the given signals. (10) (Apr/May2016)

$te^{-at}u(t), \quad a > 0$

$e^{-a|t|}, \quad a > 0$

State and prove of $x(t-t_0)$ and $x(t)e^{j\omega t}$ in terms of $X(j\omega)$

(8) (Apr/May 2012)

(or)

Obtain the Fourier transform of a pulse function defined as $x(t) = A$; $-T/2 \le t \le T/2$;

0 otherwise

(16) (Apr/May 2011)

(or)

State and prove the following properties of CTFT.
Time shifting, Time scaling, Differentiation, Modulation **(**14) (Nov/Dec 2010)

(or)

Find the Fourier transform of $x(t) = e^{-|t|}$ for $-1 \leq t \leq 1$; 0 otherwise (8) (Apr/May 2010)

(or)

Find the Fourier transform a rectangular pulse. Sketch the signal and its Fourier transform.
(8) (Nov/Dec 2009)

(or)

If $x(t) <=> X(\omega)$,then using time shifting property show that $x(t+T)+x(t-T) <=> 2X(\omega)\cos \omega t$.
(6) (Apr/May 2015)

(or)

State and prove any four properties of Fourier Transform. (16) (Nov/Dec 2015)

3. Find the Laplace Transform of the signal $f(t) = e^{-at} \sin \omega t$ (8) (Nov/Dec2013)

(or)

Compute the Laplace transform of $x(t) = e^{-b|t|}$ for the cases of $b < 0$and $b > 0$.
(10) (Apr/May 2013)

(or)

Find the Laplace Transform and its associated ROC for the signal $x(t)=te^{-2|t|}$.
(16) (Nov/Dec 2015)

Write the properties of ROC of Laplace transform. (6) (Apr/May 2013)

(or)

Prove the scaling and time shifting properties of Laplace Transform. (8) (Apr/May 2012)

Determine the Laplace transform of $x(t) = e^{-at} \cos\omega t\, u(t)$ (8) (Apr/May 2012)

(or)

Find the Laplace transform of the signal $x(t) = e^{-at} u(t) + e^{-bt} u(-t)$ (8) (Apr/May 2010)

(or)

Determine the Laplace transform of following signals:
$x_1(t) = u(t - 2)$, $x_2(t) = t^2 e^{-2t} u(t)$ (8) (Apr/May 2009)

(or)

Determine the Laplace Transform of: the signal $x(t) = \sin \pi t$; $0 < t < 1$; 0 otherwise
(8) (Apr/May 2009)

4. Finite the inverse Fourier transform of rectangular spectrum $X(j\omega) = 1$, $-W < \omega\, W$, 0 Otherwise.
(8) (Nov/Dec 2013)

(or)

Obtain the inverse Laplace Transforms of $X(s) = 1 / (s^2 + 3s + 2)$, ROC: $-2 < Re\{s\} < -1$
(8) (Nov/Dec 2012)

(or)

Obtain the inverse Laplace Transforms:
(a) $X(s) = S / (S + 1)$
(b) $X(s) = S / (S^2 + 5S + 6)$ (16) (Apr/May 2011)

(or)

Find the inverse Laplace transform of $X(s)=8s+10/(s+1)(s+2)^3$ (16) (Apr/May 2015)

5. State and prove Rayleigh's energy theorem. (6) (Apr/May 2016)