Code No: 07A3EC12 **R07** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
SIGNALS AND SYSTEMS
Common to BME, ETM, E.CONT.E, EIE, ECE

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain the Periodicity property of discrete time signal using complex exponential signal.
   (b) Consider a left sided sequence x[n] with Z transform $X(z) = \frac{1}{(1-\frac{1}{2}z^{-1})(1-z^{-1})}$
      i. Express X(z) as a ratio of polynomials in z instead of z^{-1}
      ii. Use partial fraction method to express X(z) as a sum of terms
      iii. Determine x(n) [4+12]

2. (a) Find the Fourier series of the wave shown in figure 1a.

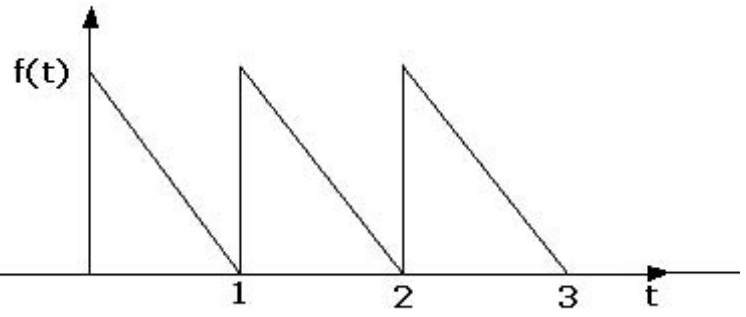

Figure 1a

   (b) Determine the Fourier series representation of x(t) = 2 Sin (2πt-3) + Sin (6πt). [8+8]

3. (a) With the help of graphical example explain sampling theorem for Band limited signals.
   (b) Explain briefly Band pass sampling. [8+8]

4. (a) Determine the Fourier Transform of a trapezoidal function and triangular RF pulse f(t) shown in figure 3a. Draw its spectrum.

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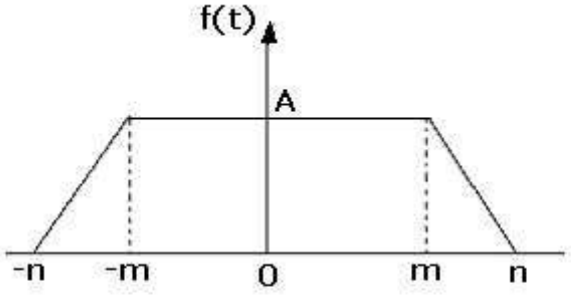

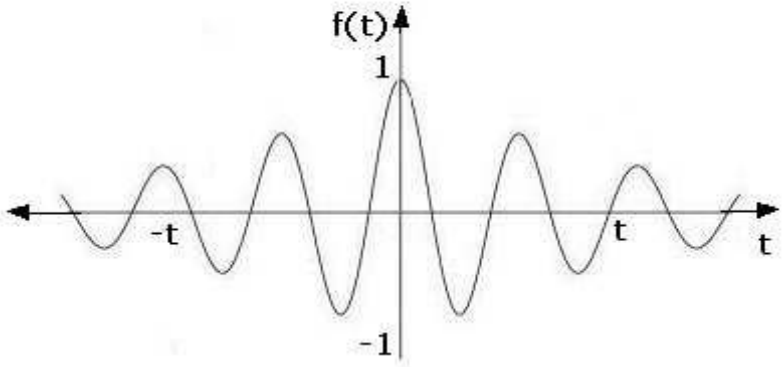

Figure 3a

(b) Using Parsevals theorem for power signals, Evaluate $\int_{-\alpha}^{\alpha} e^{-2t}u(t)dt$. [10+6]

5. (a) Find the output voltage v(t) of the network shown in figure 4a when the voltage applied to the terminals a b is given by f(t)=$e^{-t/4}$u(t)+$e^{-t/2}$u(-t)

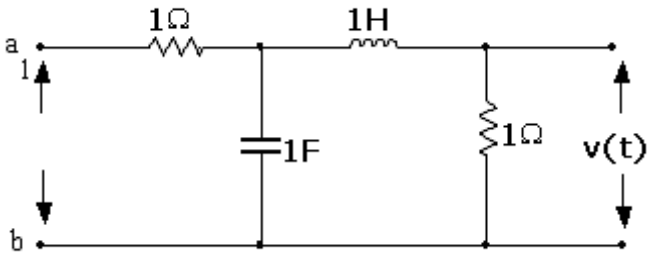

Figure 4a

(b) Show that the impulse response of ideal low pass filter is $h(t) = \frac{w}{2\pi}\ S_a\frac{w(t-t_0)}{2}$ for a distortion less transmission plot the impulse response of h(t). [8+8]

6. (a) Find the even and odd components of the signal x(t)=e^{-2t} Cos t.

(b) Discuss how an unknown function f(t) can be expressed using Infinite mutually orthogonal functions. Hence, show the representation of a waveform f(t) using Trigonometric Fourier series. [6+10]

7. (a) Consider an input x[n] and an impulse response h[n] given by

$x[n] = \left(\frac{1}{2}\right)^{n-2} u[n-2]$,
$h[n] = u[n+2]$.

Determine and plot the output $y[n] = x[n] * h[n]$.

(b) Bring out the relation between Correlation and Convolution.

(c) Explain the properties of Correlation function. [8+4+4]

8. (a) State and prove the properties of Laplace transforms.

(b) Derive the relation between Laplace transform and Fourier transform of signal. [8+8]

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Code No: 07A3EC12 **R07** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
SIGNALS AND SYSTEMS
Common to BME, ETM, E.CONT.E, EIE, ECE

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the Periodicity property of discrete time signal using complex exponential signal.
   (b) Consider a left sided sequence x[n] with Z transform $X(z) = \frac{1}{(1-\frac{1}{2}z^{-1})(1-z^{-1})}$
      i. Express X(z) as a ratio of polynomials in z instead of z^{-1}
      ii. Use partial fraction method to express X(z) as a sum of terms
      iii. Determine x(n) [4+12]

2. (a) Find the even and odd components of the signal x(t)=e^{-2t} Cos t.
   (b) Discuss how an unknown function f(t) can be expressed using Infinite mutually orthogonal functions. Hence, show the representation of a waveform f(t) using Trigonometric Fourier series. [6+10]

3. (a) Find the output voltage v(t) of the network shown in figure 4a when the voltage applied to the terminals a b is given by f(t)=$e^{-t/4}$u(t)+$e^{-t/2}$u(-t)

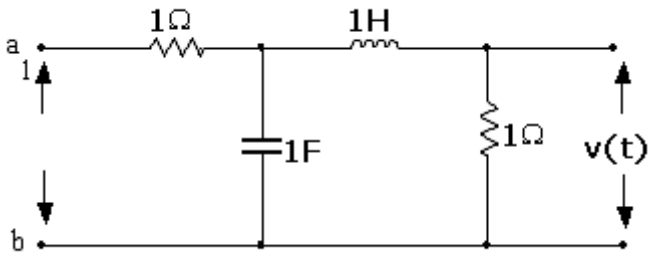


Figure 4a

   (b) Show that the impulse response of ideal low pass filter is $h(t) = \frac{w}{2\pi}\ S_a\frac{w(t-t_0)}{2}$ for a distortion less transmission plot the impulse response of h(t). [8+8]

4. (a) Consider an input x[n] and an impulse response h[n] given by
   $x[n] = \left(\frac{1}{2}\right)^{n-2} u[n-2]$,
   $h[n] = u[n+2]$.
   Determine and plot the output $y[n] = x[n] * h[n]$.
   (b) Bring out the relation between Correlation and Convolution.
   (c) Explain the properties of Correlation function. [8+4+4]

Code No: 07A3EC12 **R07** **Set No. 4**

5. (a) With the help of graphical example explain sampling theorem for Band limited signals.
   (b) Explain briefly Band pass sampling. [8+8]

6. (a) Find the Fourier series of the wave shown in figure 1a.

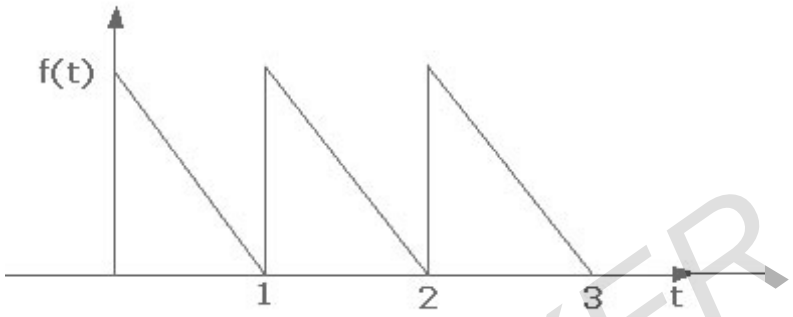
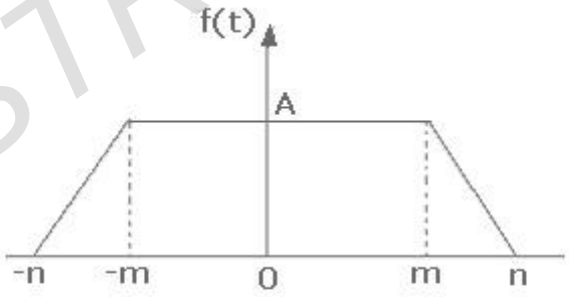


Figure 1a

   (b) Determine the Fourier series representation of
   $x(t) = 2 \text{ Sin } (2\pi t\text{-}3) + \text{Sin } (6\pi t)$. [8+8]

7. (a) Determine the Fourier Transform of a trapezoidal function and triangular RF pulse f(t) shown in figure 3a. Draw its spectrum.



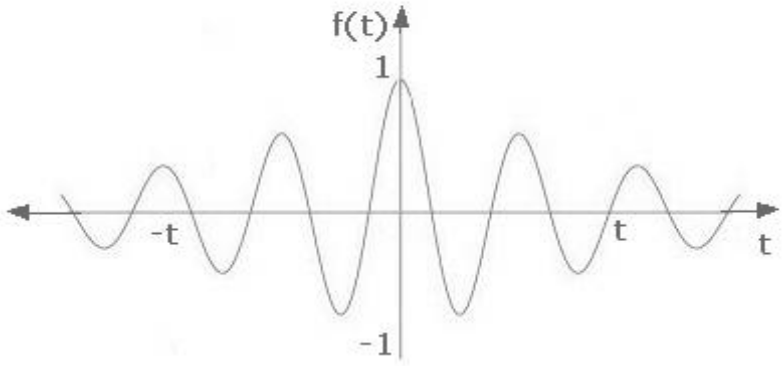


Figure 3a

   (b) Using Parsevals theorem for power signals, Evaluate $\int_{-\alpha}^{\alpha} e^{-2t}u(t)dt$. [10+6]

8. (a) State and prove the properties of Laplace transforms.

(b) Derive the relation between Laplace transform and Fourier transform of signal. [8+8]

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Code No: 07A3EC12 **R07** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
SIGNALS AND SYSTEMS
Common to BME, ETM, E.CONT.E, EIE, ECE

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Answer any FIVE Questions
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1. (a) Explain the Periodicity property of discrete time signal using complex exponential signal.
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      i. Express X(z) as a ratio of polynomials in z instead of z^{-1}
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      iii. Determine x(n) [4+12]

2. (a) Determine the Fourier Transform of a trapezoidal function and triangular RF pulse f(t) shown in figure 3a. Draw its spectrum.

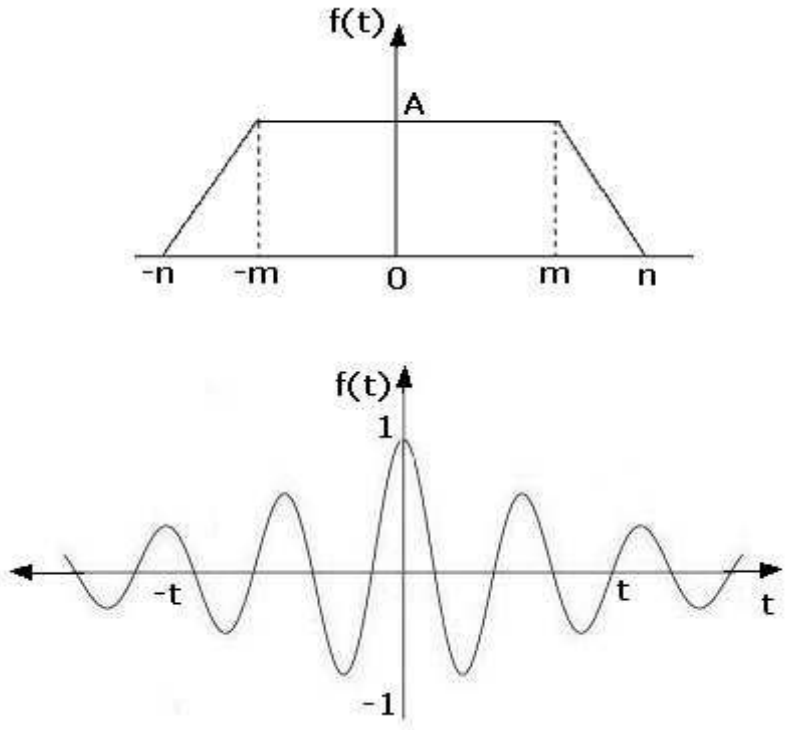

Figure 3a

   (b) Using Parsevals theorem for power signals, Evaluate $\int_{-\alpha}^{\alpha} e^{-2t}u(t)dt$. [10+6]

3. (a) Find the output voltage v(t) of the network shown in figure 4a when the voltage applied to the terminals a b is given by f(t)=$e^{-t/4}$u(t)+$e^{-t/2}$u(-t)

Code No: 07A3EC12 **R07** **Set No. 1**

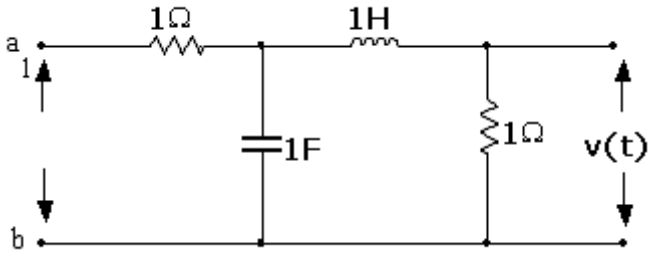

Figure 4a

(b) Show that the impulse response of ideal low pass filter is $h(t) = \frac{w}{2\pi} S_a \frac{w(t-t_0)}{2}$ for a distortion less transmission plot the impulse response of h(t). [8+8]

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(b) Explain briefly Band pass sampling. [8+8]

5. (a) Consider an input x[n] and an impulse response h[n] given by
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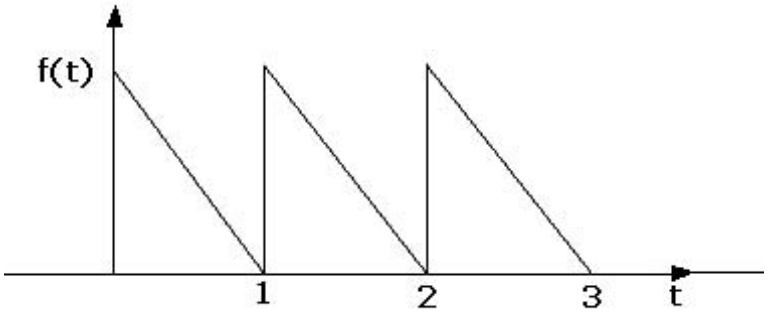
6. (a) State and prove the properties of Laplace transforms.

(b) Derive the relation between Laplace transform and Fourier transform of signal. [8+8]

7. (a) Find the even and odd components of the signal x(t)=e^{-2t} Cos t.

(b) Discuss how an unknown function f(t) can be expressed using Infinite mutually orthogonal functions. Hence, show the representation of a waveform f(t) using Trigonometric Fourier series. [6+10]

8. (a) Find the Fourier series of the wave shown in figure 1a.



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(b) Determine the Fourier series representation of
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Code No: 07A3EC12 **R07** **Set No. 3**

II B.Tech I Semester Examinations,November 2010
SIGNALS AND SYSTEMS
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Time: 3 hours **Max Marks: 80**

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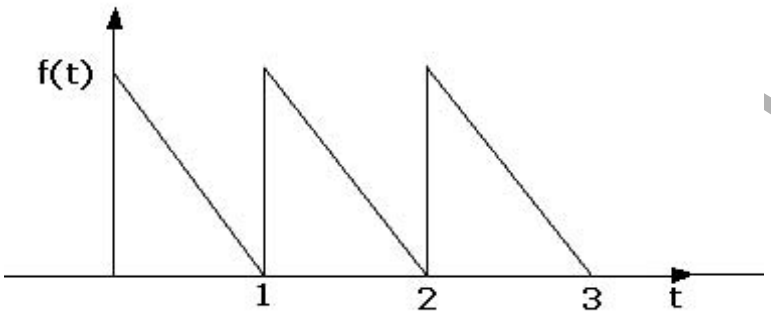

Figure 1a

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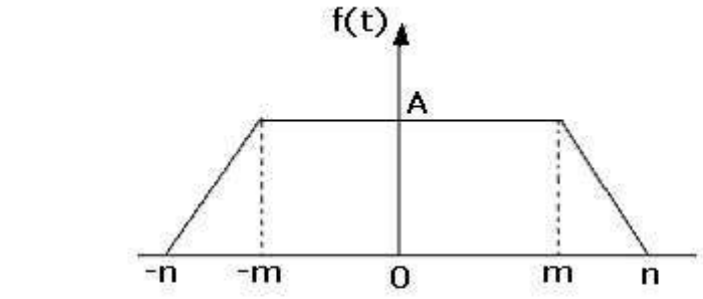
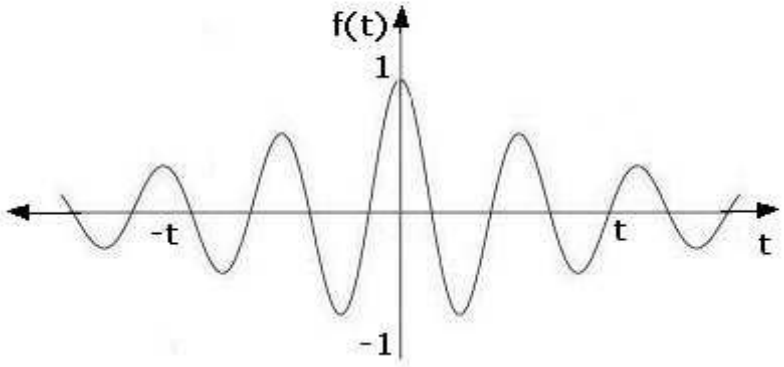
3. (a) Determine the Fourier Transform of a trapezoidal function and triangular RF pulse f(t) shown in figure 3a. Draw its spectrum.





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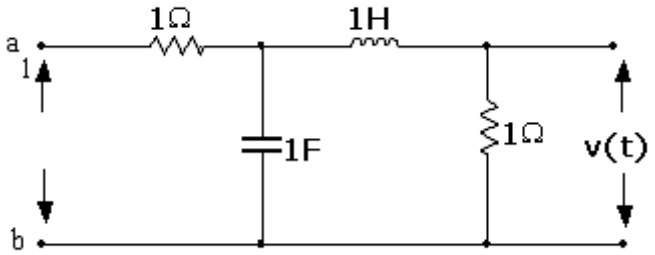

Figure 4a

(b) Show that the impulse response of ideal low pass filter is $h(t) = \frac{w}{2\pi}\ S_a\frac{w(t-t_0)}{2}$ for a distortion less transmission plot the impulse response of h(t). [8+8]

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