Rajiv Gandhi University of Knowledge Technologies

Weekly Test 5- NETWORK THEORY

Date: 22.09.2012 **Time:** 30 Min

Course: E2Sem1_(ECE-CSE) **Max Marks:** 10

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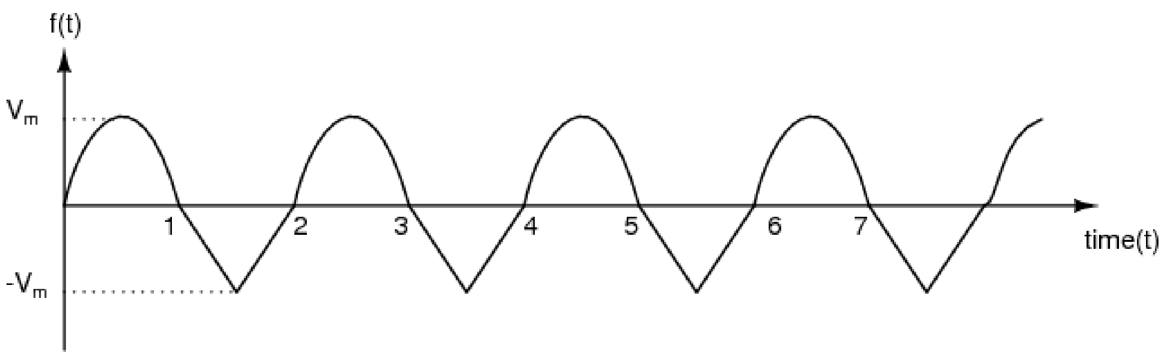
1) Find Laplace Transform of periodic waveform f(t) as shown in fig below

a) $\frac{V_m \pi}{s^2+\pi^2}\frac{(1-e^{-s})}{1-e^{-2s}}+\frac{V_m}{s^2}\frac{(-e^{-s}+2e^{-1.5s}-e^{-2s})}{1-e^{-2s}}$

b) $\frac{V_m \pi}{s^2+\pi^2}\frac{(1-e^{-s})}{1-e^{-2s}}+\frac{V_m}{s^2}\frac{(-2e^{-s}+4e^{-1.5s}-2e^{-2s})}{1-e^{-2s}}$

c) $\frac{V_m \pi}{s^2+\pi^2}\frac{1}{1-e^{-s}}+\frac{V_m}{s^2}\frac{(-2e^{-s}+4e^{-1.5s}-2e^{-2s})}{1-e^{-2s}}$

d)none of the above



2) x(t) is a periodical exponentially decaying waveform as shown in fig below,

Find (i) X(s)

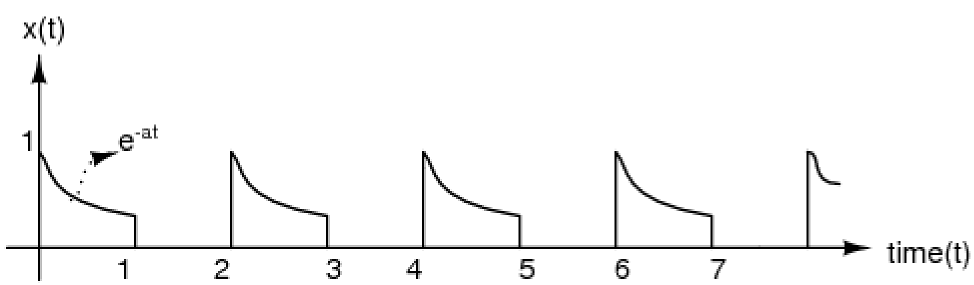
(ii) If s= -4 and a=2, what is X(s)

a) $\frac{1}{s+a}\left[\frac{1-e^{-(s+a)}}{1-e^{-2s}}\right]$, Not defined

b) $\frac{1}{s+a}\left[\frac{1-e^{-(s+a)}}{1-e^{-2s}}\right], \frac{1}{-4+a}\left[\frac{1-e^{2}}{1-e^{8}}\right]$

c) $\frac{1}{s+a}\left[\frac{1-e^{-s}}{1-e^{-2s}}\right]$, Not defined

d) $\frac{1}{s+a}\left[\frac{1-e^{-s}}{1-e^{-2s}}\right], \frac{1}{-4+a}\left[\frac{1-e^{2}}{1-e^{8}}\right]$



3) If $x(t)$ = -u(t)+u(t-1)+δ(t-1)- δ(t-2) and $y(t)=\int_{-\infty}^{t} x(t)dt$ then what is the value of `y' at t=1.5 and t=2.5

a)y(1.5)=0 and y(2.5)= 0

b) y(1.5)=0 and y(2.5)= 1

c) y(1.5)=0 and y(2.5)= -1

d) y(1.5)=-1 and y(2.5)= -1

4) Find the inverse Laplace Transform for $F(s)=\dfrac{cs^2+b}{s(s+a)}$

a) $f(t)=c\delta(t)+\dfrac{b}{a}u(t)-\dfrac{b+ac}{a}e^{-at}u(t)$

b) $f(t)=c+\dfrac{b}{a}u(t)-\dfrac{b+ac}{a}e^{-at}u(t)$

c) $f(t)=c+\dfrac{b}{a}u(t)-\dfrac{b+a^2c}{a}e^{-at}u(t)$

d) $f(t)=c\delta(t)+\dfrac{b}{a}u(t)-\dfrac{b+a^2c}{a}e^{-at}u(t)$

5) Find the inverse Laplace Transform for $F(s)=\dfrac{s+2}{s^2(s+1)^2}$

a) $f(t)=\left[-3+2t+3e^{-t}+te^{-t}\right]u(t)$

b) $f(t)=\left[-1+2t+2e^{-t}+te^{-t}\right]u(t)$

c) $f(t)=\left[-1+2t-e^{-t}+te^{-t}\right]u(t)$

d) $f(t)=\left[-3+2t-e^{-t}+te^{-t}\right]u(t)$

6) Find the inverse Laplace Transform for $F(s) = \dfrac{3s^2 + s + 3}{(s+1)(s^2+4)}$

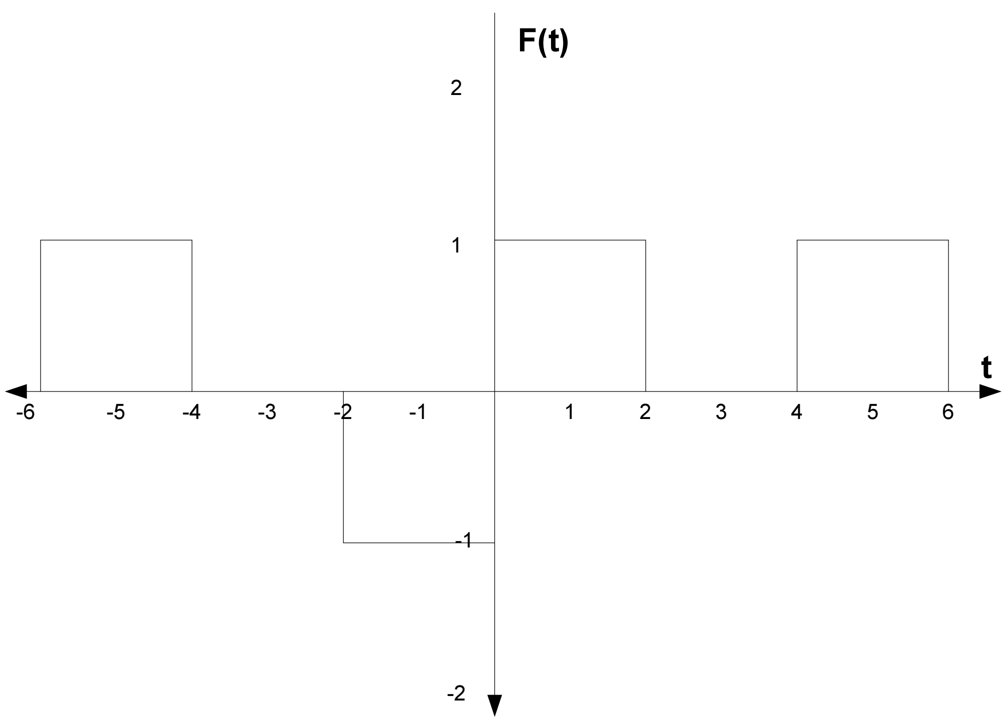
a) $f(t) = e^{-t} + 0.5\cos 2t - 2\sin 2t$

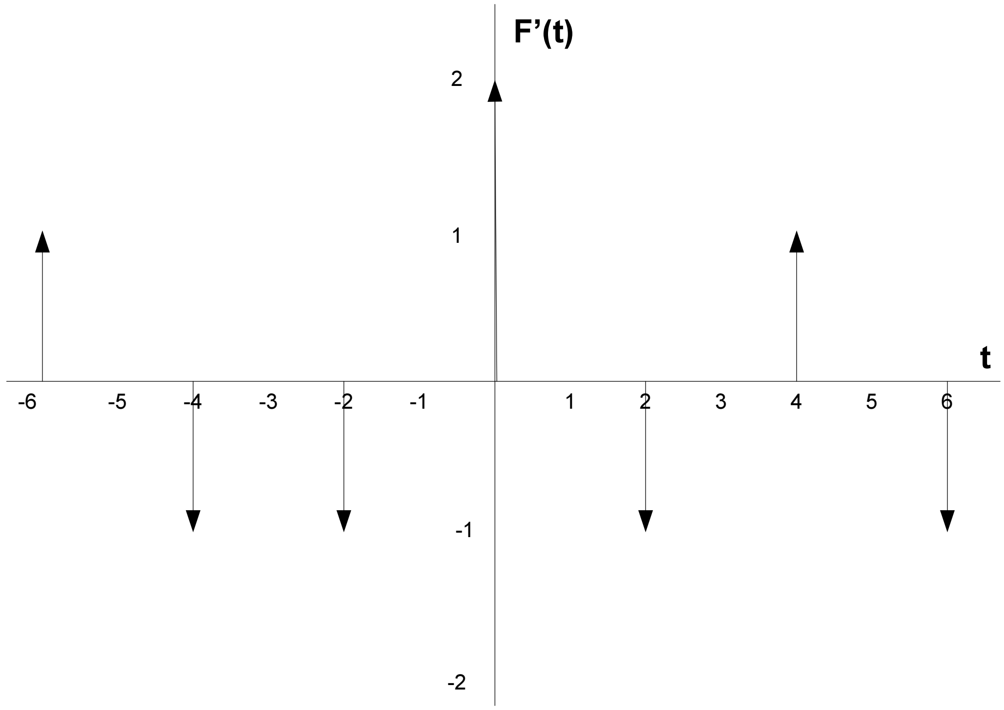
b) $f(t) = e^{-t} + 2\cos 2t - 0.5\sin 2t$

c) $f(t) = e^{-t} + 2\cos 2t - 2\sin 2t$

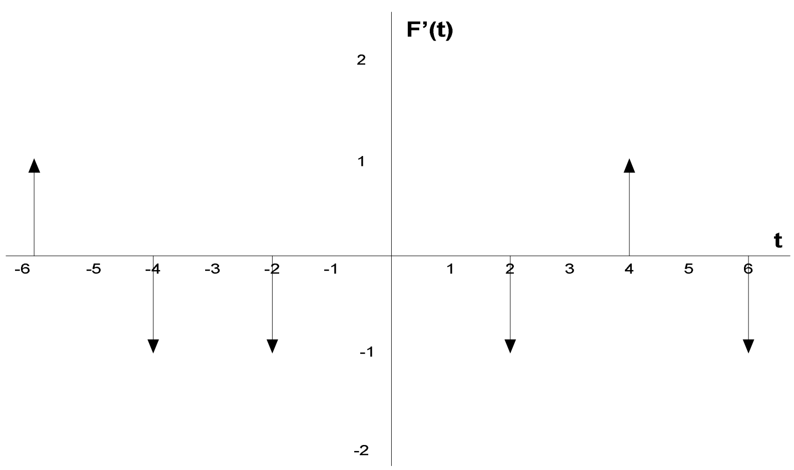
d) $f(t) = e^{-t} + 2\sin 2t - 0.5\cos 2t$

7)Find the derivative of a time domain function F(t) as shown in fig below, where F'(t)=$\dfrac{dF(t)}{dt}$

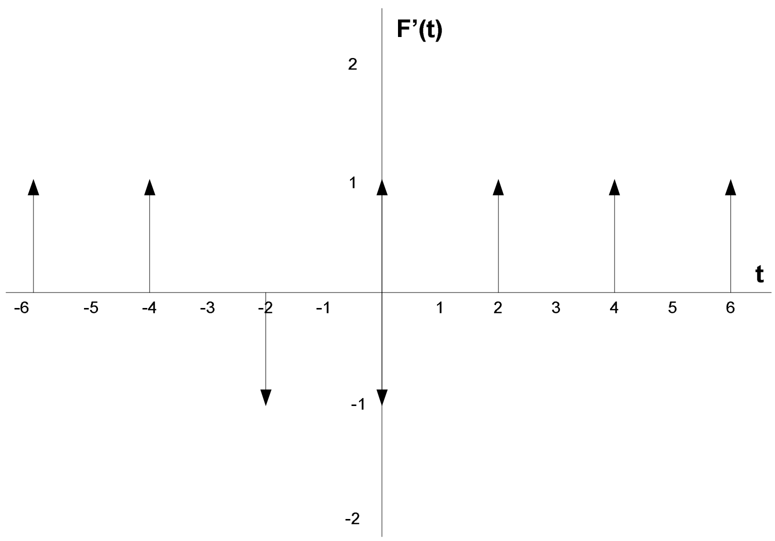




a)



(b)



(c)

(d) None of the above

8) In problem (7), Find the Unilateral Laplace Transform for F'(t)= $\frac{dF(t)}{dt}$

a) $e^{6s} - e^{4s} - e^{2s} + 2 - e^{-2s} + e^{-4s} - e^{-6s}$

b) $e^{6s} - e^{4s} - e^{2s} - e^{-2s} + e^{-4s} - e^{-6s}$

c) $2 - e^{-2s} + e^{-4s} - e^{-6s}$

d) $-e^{-2s} + e^{-4s} - e^{-6s}$

9)Find the inverse Laplace Transform for F(s)= $\cot^{-1}\left[\frac{s}{2}\right]$

a) $\frac{2\sin(2t)-1}{t}$

b) $\frac{1-2\sin(2t)}{t}$

c) $\frac{2\sin(2t)}{t}$

d) $\frac{\sin 2t}{t}$

10) Find the inverse Laplace Transform for F(s)= $\tan^{-1}\left[\frac{2}{s^2}\right]$

a) $e^{t}\sin t - e^{-t}\sin t$

b) $e^{-t}\sin t - e^{t}\sin t$

c) $2\sin(t)\sinh(t)$

d) both (a) and (c)

Key

1)c

2)a

3)c

4)d

5)a

6)b

7)a

8)c

9)d

10)d