BE CSE G1
19Z201/ TRANSFORMS AND ITS APPLICATIONS
NONASSESMENT TUTORIAL I

I. Choose the correct answer

1. A function which is not of exponential order is?

A. cosh t **B.** sinh t **C.** tan t **D.** $(e^t)^2$

2.The mathematical function representing "a satellite hit by a meteorite" is

A. exponential **B.** unit step **C.** dirac delta **D.** periodic

3. $L(\sinh 2t) = \frac{2}{s^2-4}$ is true for **A.** $s>2$ **B.** $s<2$ **C.** $s\neq 2$ **D.** $s>0$

4. Say True (T) or False (F): i. First shifting theorem – translation on t-axis
ii. Second shifting theorem – translation on s-axis

A. i – F, ii – F **B.** i – T, ii – T **C.** i – T, ii – F **D.** i – F, ii – T

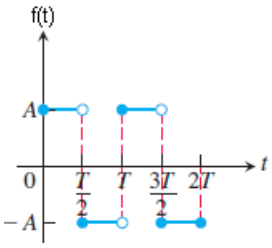
5. Let k be a constant, the Laplace transform of $\frac{k}{2}*\frac{k}{2}*\frac{k}{2}*\frac{k}{2}*.....*\frac{k}{2}$ (n times) is

A. $\frac{k}{2s^n}$ **B.** $\frac{k^n}{(2s)^n}$ **C.** $\frac{k}{2}\left(\frac{n}{s^{n+1}}\right)$ **D.** $\frac{k}{2}\left(\frac{n!}{s^{n+1}}\right)$

6. If $L(f(t)) = F(s)$ the $L(f(ct))$ is

A. cF(s) **B.** cF(cs) **C.** $cF\left(\frac{c}{s}\right)$ **D.** $\left(\frac{1}{c}\right)F\left(\frac{c}{s}\right)$

II. Given f(t) in graph below, Sketch the following functions



1. f (t) u (t-T)

2. f (t- T) u (t- T)

3. f (t) u (t-T/2) - f (t) u (t-T)

III. Obtain the inverse Laplace transform of the following function

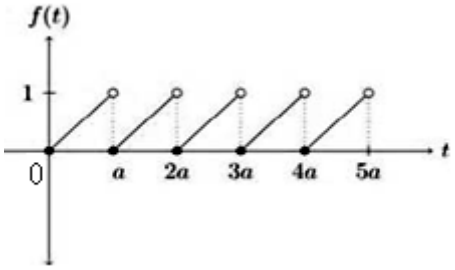
1. $F(s) = \dfrac{1}{s^2(s^2-1)}$

2. $F(s) = \ln\left(\dfrac{s-a}{s-b}\right)$

IV. Find the inverse Laplace transform of the following

1. $f(t) = te^{-t}sinht$

2.



V. Find the inverse Laplace transform of $\mathbf{F(s)} = \dfrac{5}{(s^2+1)(s^2+25)}$ using convolution theorem

VI. Solve the following differential equations using Laplace transform technique:

1. $y'' + 3y' + 2y = r(t)$; $y(0) = 0, y'(0) = 0,$ where r(t) = u(t-1) – u(t-2) + δ(t-1).

2. $-2y_1' + 3y_2' + 2y_2 = 4$; $-y_1' + 2y_2' + 3y_2 = 0$; $y_1(0) = y_2(0) = 0, y_1'(0) = 0, y_2'(0) = 0$.