(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID :121303/ 121321/121312

Roll No. | | | | | | | | | | |

B.Tech.

(SEM. III) THEORY EXAMINATION, 2015-16

BASIC SYSTEM ANALYSIS (NEE-303/EEE-301)

BASIC OF SIGNALS & SYSTEMS (EE-302)

[Time:3 hours] **Section-A** **[Total Marks:100]**

1. Attcmpts **all** parts. All parts carry equal marks. Write answer of each part in short. (2x10=20)

   (a) Define unit step and unit ramp signals with proper sketch.

   (b) Check the periodicity of the signal $x(t)=e^{j10t}$

   (c) Write Dirichlet conditions for the existence of Fourier series.

   (d) Find the Fourier transform of $(t-t_0)$.

   (e) What is time invariant and time varying system.?

   (f) State initial value theorem of z-transforms.

   (g) Find Z-transform of unit step and impulse functions

   (h) Derive Laplace transform of $\sinh \omega t$.

(i) Express the given signal in terms of step signals.

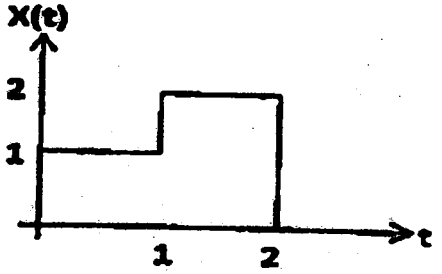


Fig.1

(j) List the advantages of state space representation of linear systems.

Section-B

Attempts **any five** question from this sections. (10x5=50)

2. (a) Find the even and odd components of the signal shown in figure.

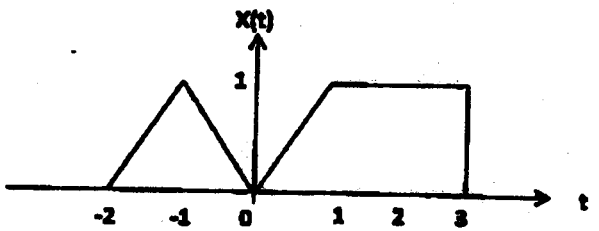


Fig.2

(b) Draw the force-Current analogy of the mechanical given in figure.

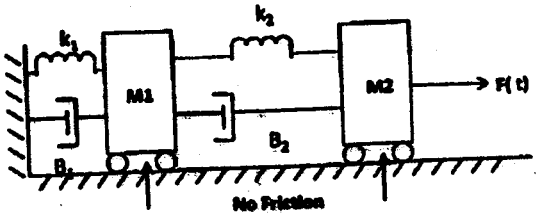
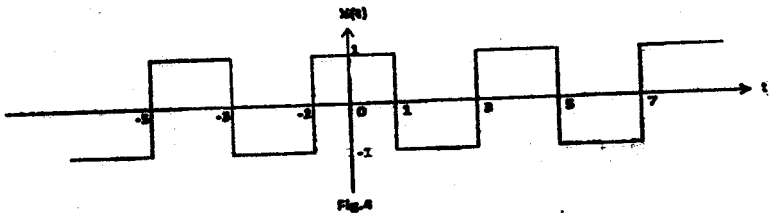


Fig.3

3. Explain the trigonometric and exponential forms of Fourier series representation of periodic signals. Find the trigonometric Fourier series for the periodic signal shown in figure.



4. (a) State and prove duality property of Fourier transform.

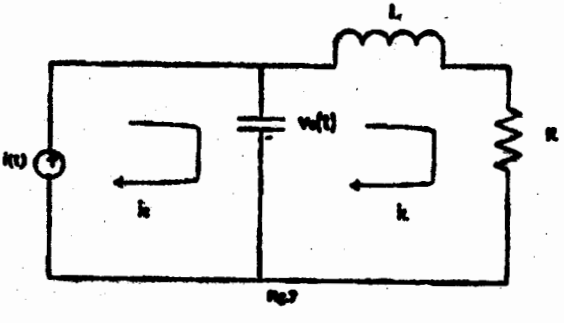
11. **Find the inverse Z-transform of following:**

(i) $X(z)=\dfrac{1-\frac{1}{3}z^{-1}}{(1-z^{-1})(1+2z^{-1})}$ ROC: $|z|>2$

(ii) $X(z)=\log(1+az^{-1})$ ROC: $|z|>|a|$

12. (a) **What is state transition matrix? List the important properties of state transition matrix.**

(b) **Obtain the state model of the electrical circuit show in Fig.7**



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