QUIZ -2

Subject: Signal and Systems **Sub. code: EE14102**

Class: B. Tech. IV Sem. Electrical Engineering

Session 2020-2021

MM: 05 **Max. Time: (35 + 10) min**

NOTE:

1. **Write your name and registration number on each page of answer sheet.**
2. **Complete your writing and drawing work using pen and paper.**
3. **Upload same on TEAM at the link in Assignment-QUIZ-2 only before allotted time (strictly).**
4. **Uploading any other location on TEAM will not be considered and you will be penalized. Please follow this instruction strictly.**
5. **You will be given 10 minutes extra to upload.**
6. **Assume any missing data.**

Q.1 The input to the system $x(t)$ and its impulse response function $h(t)$ are defined as follows.

$$x(t) = \begin{Bmatrix} 1\ for\ 0 \le t \le (m+1) \\ 0\ \ ELSEWHERE \end{Bmatrix} \qquad h(t) = \begin{Bmatrix} 1\ for\ 0 \le t \le 1.5 \\ 0\ \ ELSEWHERE \end{Bmatrix}$$

Where *m* in above problem is defined as last digit of your registration number. For example if your registration number is 20192098, then *m*=8.

Determine output of the system using convolution integral.

Q.2 For a system defined by .

$$h(t) = e^{mt}\sin(5t)\,u(t) + e^{-pt}\cos(2t)\,u(t)$$

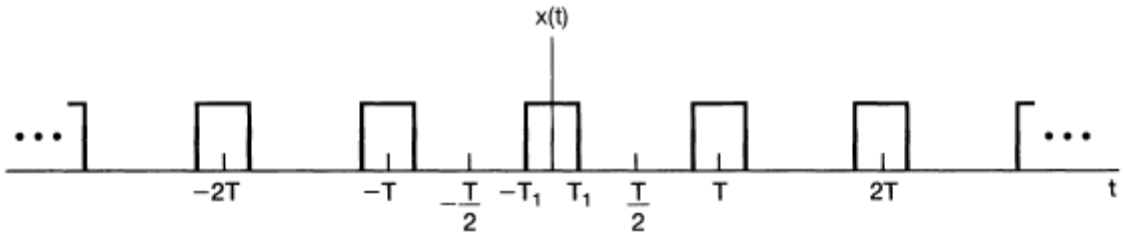
Where *m* in above problem is defined as last digit of your registration number and *p* in above problem is defined as second last digit of your registration number For example if your registration number is 20192098, then *m*=8 and *p*=9.

Get the Laplace Transformation of above system. Locate the pole zero on the s-plane. Write the region of convergence. Comment of the stability both from pole-zero location and region of convergence.

Q. 3 Consider a periodic signal defined as below.

$$x(t) = \begin{Bmatrix} 1\ for\ t < |T_1| \\ 0\ for\ |T_1| < t < T/2 \end{Bmatrix}$$

P.T.O.



Where T_1 in above problem is defined as (1+ last digit of your registration number). For example if your registration number is 20192098, then T_1 = (1+8) = 9 sec.

T = 24 sec. Write the Fourier series coefficients and draw the spectrum (coefficient of Fourier series vs sample number *k*). Comment on the spectrum shape if sample period T increases.