Code No: 153BT **R18**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B.Tech II Year I Semester Examinations, March - 2021**
**SIGNALS AND SYSTEMS**
**(Common to ECE, EIE)**

**Time: 3 hours** **Max. Marks: 75**

**Answer any five questions**
**All questions carry equal marks**

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1.a) State and prove the properties of Impulse Function.
b) How to approximate the given signal using complete set of orthogonal functions? Explain with one example. [6+9]

2.a) Find the Exponential Fourier series of train of impulses.
b) Find the Fourier Transform of the signal $x(t)=e^{-a|t|}$. [7+8]

3.a) Find and sketch the impulse response of Ideal Band pass Filter.
b) Find the convolution between the following signals:
$x(t)=e^{-at}u(t); h(t)=e^{-bt}u(t)$ [7+8]

4.a) Find the impulse response of the system described by the differential equation.
$y''(t)+5y'(t)+4y(t)=6x(t)$
b) State and prove initial final value Theorems of Z-transform. [7+8]

5.a) State and prove Sampling theorem for band limited signals.
b) Derive the relationship between Autocorrelation function and Power spectral density function. [9+6]

6.a) Find the Hilbert Transform of the signal $x(t)=\cos(t)+\sin(t)$.
b) Check the stability of the system $y(t)=tx(t)$. [7+8]

7.a) Derive the conditions for distortion less transmission through a system.
b) State and prove the multiplication theorem of Fourier Transform. [7+8]

8.a) State and prove time shifting property of Laplace Transform.
b) State and prove convolution theorem of z-transform. [7+8]

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