II B. Tech I Semester Supplementary Examinations, May - 2019
SIGNALS & SYSTEMS
(Com to ECE, EIE and ECC)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Define continuous time unit step and unit impulse   (2M)

   b) State the condition for convergence of Fourier series.   (2M)

   c) Define System and signal bandwidth.   (3M)

   d) List and state the properties of convolution Integral   (2M)

   e) Define ROC of the Laplace Transform   (2M)

   f) Find the Z-transform and its ROC of $\delta(n + k)$ (3M)

PART -B

2. a) Test Whether the signal $x(n) = (½)^n\, u(n)$ energy or power signal   (7M)

   b) Explain about analogy between vectors and signals   (7M)

3. a) State and prove the properties of Hilbert's transform   (7M)

   b) State and prove any four properties of Fourier Transform   (7M)

4. a) State and prove sampling theorem for band limited signals.   (7M)

   b) Determine the Nyquist sampling rate and Nyquist sampling interval for   (7M)
       i) $x(t) = 2sinc(100\Pi t)$ ii) $x(t) = sinc(80\Pi t)sinc(120\Pi t)$

5. a) Obtain the relationship between the bandwidth and rise time of ideal low pass filter.   (7M)

   b) Prove that autocorrelation function and energy spectral density function forms a Fourier transform pair.   (7M)

6. a) State and prove initial value and final value theorems of Laplace transform.   (7M)

   b) Find the inverse Laplace transform of x(s) = 5(s+5)/ s(s+3) (s+7); Re(s) > -3   (7M)

7. a) State and prove time shifting and time convolution properties of z- transform.   (7M)

   b) Find the inverse Z-transform of $X(z) = \dfrac{Z+2}{4z^2-2z+3}$ (7M)

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