PAPER ID-411305

Subject Code: KEC403

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM IV) THEORY EXAMINATION 2023-24

SIGNAL SYSTEM

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a.	What is Energy Signal?	02
b.	Sketch Unit Step u(t) and Ramp Signal r(t).	02
c.	Write the general formula for Laplace Transform.	02
d.	What is the Z-Transform for unit Impulse Signal ?	02
e.	Define Sampling.	02
f.	What do you mean by Continuous Time Signal?	02
g.	What is Fourier Transform?	02
h.	What is the Laplace Transform for u(t)?	02
i.	Write the general formula for Z-Transform.	02
j.	What is Nyquist Rate?	02

SECTION B

2. Attempt any *three* of the following: **3 x 10 = 30**

a.	Write a Short Note on (i) Stability of System, (ii) Time Invariant and Time Variant System.	10
b.	Explain Convolution with mathematical formulas.	10
c.	Write any two properties of Fourier Transform. Also Calculate Fourier Transform of continuous Time Signals $\mathbf{x(t)=e^{-5t}u(t).}$	10
d.	Explain any three properties of ROC of Z-Transform with example.	10
e.	Define Sampling Theorem and Nyquist Criterion. Also discuss Reconstruction of band limited signal from its samples.	10

SECTION C

3. Attempt any *one* part of the following: **1 x 10 = 10**

a.	Sketch the given signals with explanation $\mathbf{x(t)=4u(t-2)}$, $\mathbf{z(t)= e^{-2t}u(t)}$ and $\mathbf{y(t)=r(t-1).}$	10
b.	Define the following with mathematical expressions and examples (i) Energy & Power Signals, (ii) Even & odd Signals, (iii) Continuous & Discrete time signals.	10

4. Attempt any *one* part of the following: **1 x 10 = 10**

a.	What do you mean by Time Shifting, Time Scaling, Time Reversal related to signals? Explain with example.	10
b.	What is Linear Time-Invariant(LTI) System? Explain some properties of LTI System.	10

5. Attempt any *one* part of the following: **1 x 10 = 10**

a.	Write any two properties of Laplace Transform. Also Calculate Laplace Transform of continuous Time Signals $\mathbf{x(t)=e^{-2t}u(t).}$	10

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b.	Explain Continuous Time Fourier Transform(CTFT) & Discrete Time Fourier Transform(DTFT).	10

6. Attempt any *one* part of the following: 1 x 10 = 10

a.	What is Z Transform? Determine the z-transform of $\mathbf{x(n) = (1/2)^n u(n)}$ and depict the ROC.	10
b.	What is ROC? Explain any three properties of Z-Transform with example.	10

7. Attempt any *one* part of the following: 1 x 10 = 10

a.	Write a short note on following with suitable graph: (i) Natural Sampling, (ii) Aliasing.	10
b.	Explain Ideal Sampling with mathematical expressions, time domain & frequency domain graphs.	10