PAPER ID-311340

Subject Code: KEE303

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

B TECH
(SEM-III) THEORY EXAMINATION 2020-21
BASIC SIGNAL AND SYSTEMS

Time: 3 Hours ***Total 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**

Qno.	Question	Marks	CO
a.	Define Signal.	2	1
b.	Check the periodicity of the signals given below: $x(t)=sin(8t-1)-sin(3t-1)$	2	1
c.	Differentiate between CTFT and DTFT.	2	2
d.	What are advantages of Laplace transform.	2	2
e.	Find the ROC of $x(t)=e^{-2t}u(t)+ e^{-3t}u(t)$	2	3
f.	State the convolution property for continuous and discrete time domain signal in z-transform.	2	3
g.	Draw the signal $x(t)=u(t)-u(t-3)$	2	3
h.	What is interpolation in sampling?	2	4
i.	What is the necessary condition for an LTI system to be stable?	2	4
j.	Write the S-domain transfer function of a first order system?	2	5

SECTION B

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

Qno.	Question	Marks	CO
a.	If X(s)=(2s+3)/((s=1) (s+2), find x(t) for i. System is stable. ii. System is causal. iii. System is non-causal	10	1
b.	Find the Fourier transform of the signals below: i) $x(t)=\begin{cases}A, & \lvert t\rvert < T_0\\ 0, & \lvert t\rvert > T_0\end{cases}$ ii) x (t)= e^{-at} u (t)	10	2
c.	Explain the principle of linearity of DT system.	10	3
d.	Plot x(t)=u(t)-r(t-1)+2r(t-2)-r(t-3)+u(t-4)-2u(t-5). Find the even and odd parts of the signals.	10	4
e.	State and Prove sampling theorem	10	5

SECTION C

3. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Prove that power of energy signal is zero over infinite time.	10	1
b.	What is Shannon's sampling theorem? Also discuss aliasing by taking example	10	1

4. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Determine whether the following continuous time system: Y(t)=x(t) cos (100πt) is i) Linear and non-linear ii) Shift variant and shift invariant iii) stable or unstable iii) causal and noncausal	10	2
b.	Determine the impulse response function h(t) of ideal BPF with passband gain of A Hz and passband BW of B Hz centered on f_0 Hz and having a linear phase response.	10	2

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5. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Find the energy and power of the signal: i) X(t)=cos(at) ii) $x(t)=Ae^{-\alpha t}u(t)$ where $\alpha>0$	10	3
b.	State and prove initial and final value theorem for z transform.	10	3

6. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	A causal LTI system is described by difference equation: y(n)=y(n-1) + y(n-2) +x(n-1) find the system function H(z) for this system.	10	4
b.	Explain Fourier transform of single sided exponential pulse.	10	4

7. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	If the Laplace transform of x(t) is $(s+2)/(s^2+4s+5)$, determine the Laplace transform of y(t)=x(2t-1)u(2t-1)	10	5
b.	Explain system bandwidth and rise time for low pass filter and prove that t_r=0.35?B	10	5