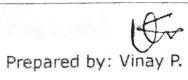| Vivekananda College of Engineering & Technology,Puttur |
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| [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®] |
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CRM08	Rev 1.10	‹EC›	‹29/07/2022›

CONTINUOUS INTERNAL EVALUATION – 2

Dept: ECE	Sem / Div: IV	Sub: Signals and Systems	S Code:18EC45
Date:05/08/22	Time:9:30-11:00am	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN	Questions	Marks	RBT	CO's
	PART A			
1 a	Show that the step response of an LTI system is running integral of impulse response and also prove distributive property of convolution integral.	9	L2	CO2
b	Determine whether the following systems represented by impulse responses are stable and causal: (i) $h[n] = u[n-1] - u[n-5]$ (ii) $h[n] = 0.5^{|n|}$ (iii) $h(t) = e^{-t}u(-t)$ iv) $h(t) = u(t-1)$	8	L3	CO2
c	What is Region of Convergence (ROC) of Z-Transform? Mention its properties with examples.	8	L2	CO4
	OR			
2 a	State and prove distributive and associative property of convolution sum.	9	L2	CO2
b	Evaluate the step response for the LTI system represented by the following impulse responses. i) $h(t) = e^{-|t|}$ ii) $h[n] = \left(\frac{1}{2}\right)^n u[n-2]$	8	L3	CO2
c	Find the z-transform by using appropriate properties. i) $x[n] = n\sin\left(\frac{\pi}{2}n\right)u[-n]$	8	L3	CO4

ii) $x[n]=(n-2)(\frac{1}{4})^{n}u[n-2]$

PART B

3	a	Find the time domain signal corresponding the following Z-transform, $$X(z)=\frac{(0.25z^{-1})}{((1-0.5z^{-1})(1-0.25z^{-1}))}$$ with the ROCs i)$0.25 < \|z\| < 0.5$ ii) $\|z\| < 0.25$ iii) $\|z\| > 0.5$	9	L3	CO4
	b	State and prove the following properties of Z-transform: (i) Time-reversal (ii) Convolution	8	L2	CO4
		Using power series expansion method determine the inverse z-transform of I) $X(z)=e^{z^{1}}$ ii) $X(z)=\frac{1}{1+\frac{1}{2}z^{-1}}$ ROC $\|z\| > 0.5$	8	L2	CO4

OR

4	a	A discrete LTI system is characterized by following Difference equation: y[n] = y[n-1] +y[n-2] +x[n-1] i) Find the system function. ii) Indicate ROC if system is stable. iii) Indicate ROC if system is causal. iv) Obtain impulse response in both cases.	9	L3	CO4
	b	The z-transform of a sequence is given by, $$X(z)=\frac{(z(z^{2}-4z+5))}{((z-1)(z-2)(z-3))}$$ find x(n) for the following ROCs, i)$2< \|z\| < 3$ ii) $\|z\| > 3$	8	L3	CO4
	c	Find the Z-transform and sketch the ROC, poles and zeroes in the Z-plane. $x[n] = 0.5^{n}u[n] + 2^{n}u[-n-1]$	8	L2	CO4

Prepared by: Vinay P.

HOD