Vivekananda College of Engineering & Technology, Puttur [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®] Affiliated to VTU, Belagavi & Approved by AICTE New Delhi			
CRM08	Rev 1.10	<EC>	<26/08/2022>

CONTINUOUS INTERNAL EVALUATION - 3

Dept: ECE	Sem / Div: IV	Sub: Signals and Systems	S Code: 18EC45
Date: 02/09/22	Time: 9:00-10:30am	Max Marks: 50	Elective: N

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

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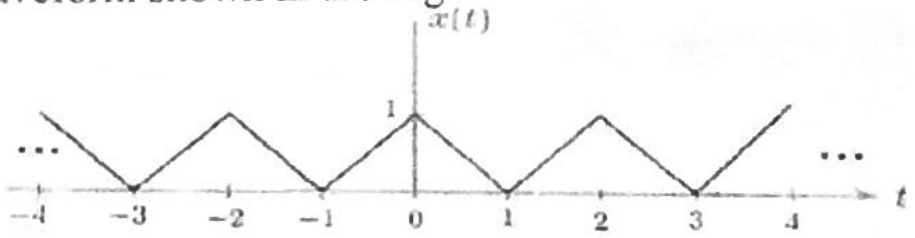
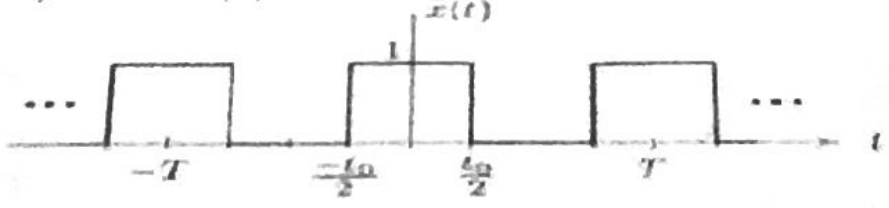
QN		Questions	Marks	RBT	CO's
		PART A			
1	a	Find the complex Fourier Series coefficients X(k) for the waveform shown in the Fig. 	9	L3	CO3
	b	State and prove the following properties of Continuous-Time Fourier Series: (i) Frequency shifting (ii) Time differentiation	8	L2	CO3
	c	Find the DTFT of $x[n] = a^{\|n\|}$; $\|a\| < 1$.	8	L3	CO4
		OR			
2	a	*Using the derivative property of continuous-time Fourier series, obtain X(k) of the signal x(t) shown in Fig.* 	9	L3	CO3

	b	Obtain the Fourier transform of the signal $x(t) = e^{-at}\,u(t)$;a>0 Draw its magnitude and phase spectrum.	8	L2	CO3
	c	Find complex Fourier series coefficients X(k) of the signal $x(t) = \lvert\sin\pi t\rvert$	8	L3	CO3
		PART B			
3	a	Find the DTFT of the following sequences: (i) $x[n] = n\,0.5^n u[n]$ (ii) $x[n] = \left(\frac{1}{4}\right)^n u[n-4]$ (iii) $x[n] = \left(\frac{1}{4}\right)^n u[n] * \left(\frac{1}{3}\right)^n u[n]$	9	L3	CO4
	b	State and prove the following properties with respect to DTFT: (i) Frequency differentiation (ii) Time-domain Convolution	8	L2	CO4
		The DTFT of a real signal is $X(e^{j\Omega})$. Express DTFT of each of the following signals in terms of $X(e^{j\Omega})$: (ii) $x[-n]$ (ii) $x[n] * x[-n]$ (iii) $(-1)^n x[n]$ (iv) $(1 + \cos n\pi)x[n]$	8	L3	CO4
		OR			
4	a	Find the Fourier Transform of the following signals: (i) $x(t) = \delta(t+1) - \delta(t-1)$ (ii) $x(t) = \frac{d}{dt}[te^{-2t}\sin t\,u(t)]$	9	L3	CO3
	b	State and prove the following properties with respect to continuous-time Fourier Transform: (i) Time shifting (ii) Parseval's theorem	8	L2	CO3
	c	Show that for a real-valued aperiodic signal x(t), the real part of its Fourier transform is an even function of frequency and the imaginary part is an odd function of frequency.	8	L2	CO3

Prepared by: Vinay P.

HOD