CODE No.:16BT30402 SVEC-16

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

II B.Tech I Semester (SVEC-16) Regular/Supplementary Examinations November - 2018

SIGNALS AND SYSTEMS

[Electronics and Communication Engineering]

Time: 3 hours **Max. Marks: 70**

Answer One Question from each Unit
All questions carry equal marks

UNIT-I

1 a) Find the Symmetric and Anti-Symmetric parts of the following signals. CO1 7 Marks

i) $x_1(t) = e^{-2t}\sin t$,

ii) $x_2(t) = a\sin(\omega t + \pi/3)$

iii) $x_3(n) = \alpha^n u(n)$

b) Determine whether the following signal is periodic or not? If periodic determine the fundamental period CO1 7 Marks

i) $x(t) = \cos(2\pi t) + \sin(\sqrt{3}t)$,

ii) $x[n] = e^{j(2\pi n/3)} - e^{j(6\pi n/7)}$.

(OR)

2 Determine whether the following systems are linear, time invariant, causal, static or not. CO1 14 Marks

i) $y(n) = x(n^2)$ ii) $y(n) = x^2(n)$

iii) $y(n) = ax(n) + b$ iv) $y(n) = e^{x(n)}$

UNIT-II

3 a) Write short notes on Direchelt conditions of fourier series. CO1 7 Marks

b) Find the trigonometric Fourier series for periodic signal x(t) shown in fig.1. CO1 7 Marks

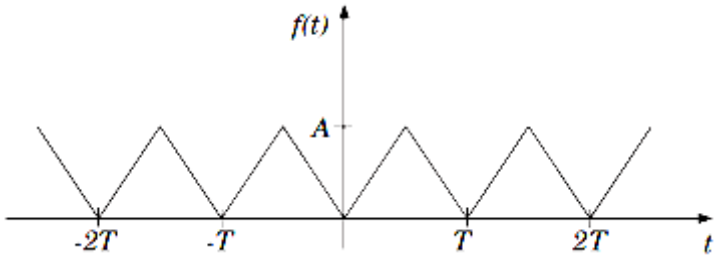
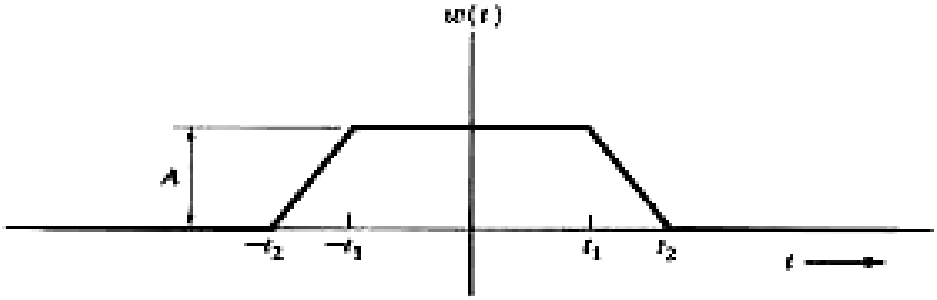


Fig.1

(OR)

4 a) Obtain Fourier transform of the trapezoidal pulse shown in fig.2. CO4 7 Marks



b) State and prove the following properties of Fourier transform. CO4 7 Marks

i) Time differentiation property.

ii) Frequency shifting property.

UNIT-III

5	a)	Examine how auto correction and average power are related for signal $x(t)$.	CO2	6 Marks
	b)	Define the terms related to discrete LTI systems. i) Inverse system, ii) Deconvolution.	CO1	8 Marks
		(OR)		
6	a)	If a function $x(t)$ has a power spectral density $S(W)$, find the power spectral density of i) Integral $x(t)$. ii) Derivative of $x(t)$. iii) Bring out the relation between them.	CO2	8 Marks
	b)	State the properties of auto correction function.	CO1	6 Marks

UNIT-IV

7	a)	Determine the inverse Laplace transform of $X(s) = \frac{2}{s(s+1)(s+2)^2}$.	CO4	7 Marks
	b)	Determine the inverse Laplace transform of $X(s) = \frac{1}{(s+2)(s^2+1)}$.	CO4	7 Marks
		(OR)		
8		State and prove the following properties of Laplace transform. i) Time differentiation. ii) Time integration. iii) Linearity. iv) Initial value theorem. v) Time scaling.	CO1	14 Marks

UNIT-V

9	a)	Explain the following sampling techniques. i) Natural sampling. ii) Flat top sampling.	CO1	7 Marks
	b)	Explain why over sampling is restored to in certain applications. How does it help?	CO2	7 Marks
		(OR)		
10	a)	State and prove the following properties of the Z-Transforms. i) Scaling. ii) Conjugation. iii) Time reversal.	CO1	7 Marks
	b)	Determine the step response of the system defined by the difference equation $\boldsymbol{y(n) - 0.6y(n-1) + 0.08y(n-2) = x(n-1) + x(n-2)}$ by applying Z-Transforms.	CO4	7 Marks

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