

Hall Ticket Number:

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**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**  
*Accredited by NAAC with A++ Grade*

Code No. : 16342 O

**B.E. (E.E.E.) VI-Semester Backlog Examinations, May/June-2023**  
**Signals and Systems**

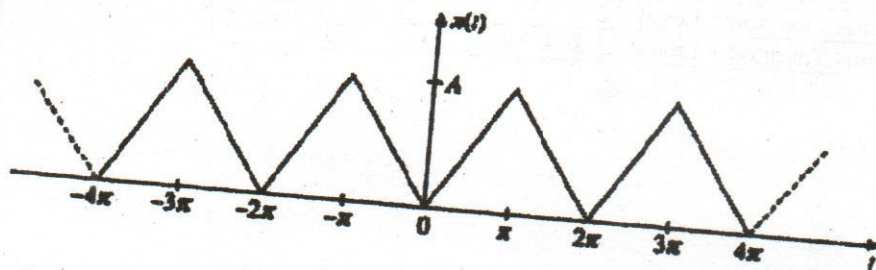
Time: 3 hours

*Note: Answer all questions from Part-A and any FIVE from Part-B*

Max. Marks: 60

**Part-A (10 × 2 = 20 Marks)**

Q. No.	Stem of the question				
		M	L	CO	PO
1.	Name any three elementary signals and sketch them.				
2.	Define a system.	2	2	1	1,2,3,12
3.	Write the relationship between exponential Fourier series and trigonometric Fourier series.	2	1	1	1,2,3,12
4.	Define transfer function.	2	2	1	1,2,3,12
5.	Define Quantization.	2	1	1	1,2,3,12
6.	Compare Laplace transform with Fourier transform.	2	1	2	1,2,3,12
7.	Express discrete unit step signal as a sum of shifted impulse signals.	2	2	1	1,2,3,12
8.	Define Region of convergence when referred to Z – transforms.	2	2	3	1,2,3,12
9.	Define Power Spectral Density (PSD).	2	1	3	1,2,3,12
10.	Define correlation of any two signals.	2	1	4	1,2,3,12
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Determine whether the signal $x(t) = t^2 u(t)$ is an energy signal or power signal or neither power nor energy signal.	3	3	1	1,2,3,12
b)	Using appropriate examples, explain about classification of systems.	5	2	1	1,2,3,12
12. a)	Determine the trigonometric Fourier series for the waveform shown below:	5	3	1	1,2,3,12



2023  
(10)

13. a)	Write the properties of Linear Time Invariant (LTI) systems.	3	1	1	1,2,3,12
b)	State the sufficient conditions required for existence of Laplace transform of a continuous time signal.	4	1	1	1,2,3,12
14. a)	Determine the inverse Laplace transform of the signal $X(s) = \frac{s+3}{(s^2+10s+41)}$ with Region of Convergence (ROC) as $\text{Re}(s) > -5$ .	4	3	1	1,2,3,12
b)	Check the properties causality and stability of the system $y[n] = x^2[n] + \frac{1}{x^2[n-2]}$	4	3	3	1,2,3,12
15. a)	State and prove linearity and time shifting property of Z transforms.	4	2	3	1,2,3,12
b)	Determine convolution of the signals $x(t)=e^{-5t}u(t)$ and $h(t)=u(t-1) - u(t-2)$ .	4	3	4	1,2,3,12
16. a)	Determine the correlation of the signals $h[n]=\{4,2,3,1\}$ and $x[n]=\{-3,3,4,-4\}$ .	4	3	4	1,2,3,12
b)	Check the properties linearity and time invariance for the system with equation $y(t) = at^2 x(t)+bt x(t-5)$ .	4	3	1	1,2,3,12
17. a)	Determine inverse Fourier transform of the signal $X(\omega) = \frac{j\omega}{(2+j\omega)^2}$	4	3	1	1,2,3,12
b)	Answer any <i>two</i> of the following: State Sampling theorem and obtain the condition for sampling of a continuous time signal such that the signal is recovered without aliasing.	4	2	2	1,2,3,12
c)	Determine the impulse response of the discrete - time system with the difference equation $y[n] = x[n] - 3x[n - 1] + \frac{9}{4}y[n - 1] - \frac{1}{2}y[n - 2]$ when the system is stable.	4	4	3	1,2,3,12
	Determine Energy Spectral Density of the signal $x(t)=e^{-4t}u(t)$ .	4	3	4	1,2,3,12

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	23.75%
ii)	Blooms Taxonomy Level - 2	26.25%
iii)	Blooms Taxonomy Level - 3 & 4	50%

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