Hall Ticket Number:

Code No. : 14465 O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

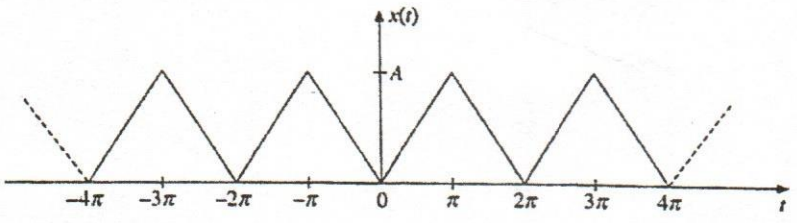
B.E. (E.C.E.) IV-Semester Backlog Examinations, July-2023

Signal Analysis and Transform Techniques

Time: **3 hours** Max. Marks: **60**

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

Part-A (10× 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO/PSO
1.	Classify signals in all respects.	2	1	1	1/3
2.	Define energy and power signals.	2	1	1	1/3
3.	If x(t) is a continuous time signal, define its Fourier transform pair.	2	1	2	1/3
4.	What are the properties of an LTI system?	2	1	3	1/3
5.	Which conditions should be satisfied by the x(t) for the existence of Laplace transform?	2	1	2	1/3
6.	Give the remedies for aliasing effect.	2	1	4	1/3
7.	Find the Fourier transform of $(1/2)^n u(n-1)$.	2	2	5	2/3
8.	List the properties of linear convolution.	2	1	3	1/3
9.	Determine the Z-transform and R.O.C of $x(n)= (-b)^n u(n-1)$.	2	2	5	2/3
10.	State the initial values theorem of Z-transform.	2	1	5	1/3
	Part-B (5×8 = 40 Marks)				
11. a)	Explain the terms with respect to a system: a) Time invariance b) Linearity.	2	2	1	1/3
b)	Compute the Exponential Fourier series of a half-wave rectified sine function shown in the figure below. 	6	3	2	4/3
12. a)	Find the Fourier transform of the sinusoidal function $\sin(w_0 t)$.	4	3	2	2/3
b)	Explain the distortionless transmission of an LTI system.	4	2	3	1/3

Contd... 2

Code No. : 14465 O

13. a)	Verify the Initial and final values theorem for $x(t)=4-2e^{3t}$ using Laplace Transforms?	4	3	2	3/3
b)	Explain the Natural sampling with neat sketches.	4	2	4	2/3
14. a)	The impulse response for Discrete LTI System is given by $(\frac{1}{2})^n u(n) + (-\frac{1}{2})^n u(n)$. Analyze the system for stability.	4	3	1	4/3
b)	Determine the Convolution of two sequences x(n)={3,2,1,2}, h(n)={1,2,1,2} using tabular method.	4	3	3	3/3
15. a)	Find the Z=Transform of the sequence given $(n) = 2(3)^n u(-n)$ *and sketch the ROC*.	4	3	5	2/3
b)	State the properties of ROC of Z-Transform with neat sketches.	4	3	5	1/3
16. a)	Analyze the following system for causality, linearity, time invariance and stability, $y(n) = 2x(n+1) + [x(n-1)]^2$.	4	4	1	4/3
b)	Find the Inverse Fourier Transform of the $X(\omega) = e^{-j2\omega}\ u(\omega)$	4	2	2	2/3
17.	Answer any ***two*** of the following:				
a)	State and prove any two properties of Laplace transform.	4	2	2	2/3
b)	Compute the discrete Fourier transform of the sequence $x\,[n] = \{1,2,3,1\}$.Also mention the limitations of DTFT.	4	2	5	3/3
c)	Determine the Inverse Z-transform of the following by the Partial fraction expansion method. $X(Z)=\frac{Z+2}{2Z^2-7Z+3}$ for the R.O: i) $\|Z\|>3$ ii) $\|Z\|<1/2$ iii)$(1/2)<\|Z\|<3$.	4	3	5	3/3

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	32.5%
iii)	Blooms Taxonomy Level – 3 & 4	47.5%

*****