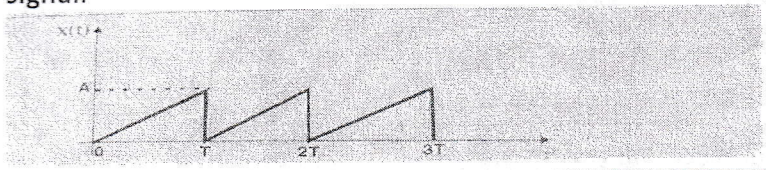
K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2025
Program: B. Tech .Scheme III
Regular Examination Semester: IV
Course Code:EXC404 and Course Name: Signals and Systems
Date of Exam:26/05/2025 Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	**Solve any two questions out of three: (05 marks each)**	10		
a)	**Determine cross-correlation for the sequence $x_1(n)$= [2,3,4] and $x_2(n)$= [1,2,3] by using tabular method.**		1	Ap
b)	**Compute Autocorrelation function of :$x(t)=e^{-5t}u(t)$**		2	Ap
c)	**Determine Trignometric Fourier series coefficient bn of the following signal:** 		3	Ap
Q 2	**Solve any two questions out of three: (05 marks each)**	10		
a)	**Compute Fourier transform of Signum Function**		4	Ap
b)	**Determine Laplace transform of following signals:** $x(t)=e^{-at}\sin wt\, u(t)$		5	Ap
c)	**Determine z Transform and ROC in Z plane of following sequences:** $x(n)= -a^n u(-n-1)$; $a<1$		6	Ap
Q.3	**Solve any two questions out of three. (10 marks each)**	20		

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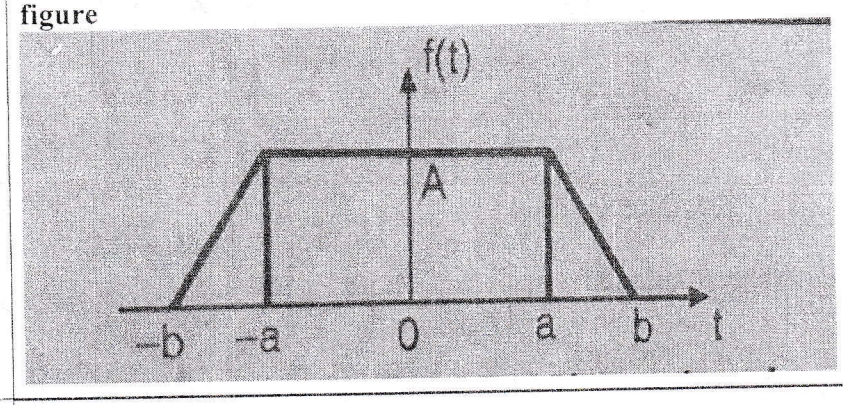
a)	x(n)={1,1,1,1,2 } . Sketch following signals: a)x(n),b)x(n-2),c)x(n)u(n-1),d)x(3-n),e)x(n-1).		1	Ap
b)	Perform between x(t)=u(t) and h(t)=e^{-t} u(t) using convolution Integral with neat sketches.		2	Ap
c)	Determine Fourier Transform of trapezoidal function shown in figure 		4	Ap
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	Determine autocorrelation for the sequence x(n)={0,1,2,3} using direct computation and tabular method and sketch its autocorrelation function.		2	Ap
b)	Compute Inverse Laplace transform of X(s)=(3s+7)/(s^2-s-12) Find out inverse Laplace Transform of i)Re(s)>4.ii)Re(s)<-3 iii) -3< Re(s)<4		5	Ap
c)	Find the inverse z-transform using the partial fraction Method and sketch x[n]. X[z] = (3 + 2z^{-1} + z^{-2}) / (1- 3z^{-1} + 2z^{-2}).		6	Ap

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