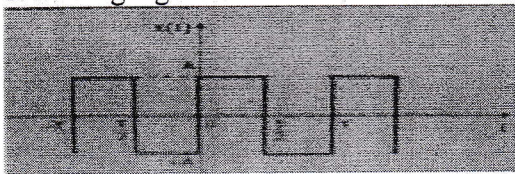


**K. J. Somaiya Institute of Technology, Sion, Mumbai-22**  
(Autonomous College Affiliated to University of Mumbai)

<del>May-June 2025</del> <i>July-August-2025</i>	
Program: B. Tech .Scheme III	
<i>Supplementary</i> - Regular Examination Semester: IV	
Course Code:EXC404 and Course Name: Signals and Systems	
Date of Exam: <del>26/05/2025</del>	Max. Marks: 60
<i>04/08/2025</i>	

(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
<b>Q 1</b>	<b>Solve any two questions out of three: (05 marks each)</b>	10		
a)	Explain classification of continuous time systems with example (any two)		1	U
b)	Determine cross-correlation for the sequence $x_1(n) = [1, 2, 3, 4]$ and $x_2(n) = [3, 2, 1, 0]$ using tabular method.		2	Ap
c)	Determine Trigonometric Fourier series coefficient $b_n$ of the following signal. 		3	Ap
<b>Q 2</b>	<b>Solve any two questions out of three: (05 marks each)</b>	10		
a)	Compute Fourier transform of following signals: $x(t) = t e^{-at} u(t)$		4	Ap
b)	Determine Laplace transform of following signals: $x(t) = e^{-at} \sin \omega t u(t)$		5	Ap
c)	Determine z Transform of following sequences: $x(n) = (n+1) u(n)$		6	Ap
<b>Q.3</b>	<b>Solve any two questions out of three. (10 marks each)</b>	20		
a)	For the signal $x(t)$ depicted in figure . Sketch the signals: i) $x(-t)$ , ii) $x(t+1)$ , iii) $x(t+2)$ , iv) $x(3t)$ , v) $x(t/3)$ .		1	Ap

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<u>04/08/2025</u>		

b)	Determine cross-correlation for the sequence $x_1(n)=[1,2,3,4]$ and $x_2(n)=[3,2,1,0]$ by using direct computation and tabular method	2	Ap
c)	The differential equation of the LTI system is $[d^2y(t)/dt^2] + 3[dy(t)/dt] + 2y(t) = x(t)$ . Calculate output if input $x(t) = e^{-3t}u(t)$ is applied to system using Fourier transform.	4	Ap
<b>Q.4</b>	<b>Solve any two questions out of three. (10 marks each)</b>	20	
a)	Perform convolution of given signals using Convolution Integral $x_1(t)=e^{-2t}u(t)$ with $x_2(t)=e^{-5t}u(t)$	2	Ap
b)	Determine Laplace Transform of $x(t)=e^{-at}u(t)+e^{-bt}u(-t)$ where $a>0, b>0$ and sketch its ROC .	5	Ap
c)	Determine Inverse z Transform of $X(z)=(z^3-4z^2+5z)/(z-1)(z-2)(z-3)$ i) ROC : $ z >3$ ii) ROC : $ z <1$ iii) ROC : $2< z <3$ by using partial fraction method..	6	Ap

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