

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

Supplementary

04/08/2025

(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)	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 Trignometric Fourier series coefficient b_n of the following signal. 		3	Ap
Q 2	Solve any two questions out of three: (05 marks each)	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
Q.3	Solve any two questions out of three. (10 marks each)	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

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

May-June 2025

Program: B. Tech .Scheme III

Supplementary Regular Examination Semester: IV

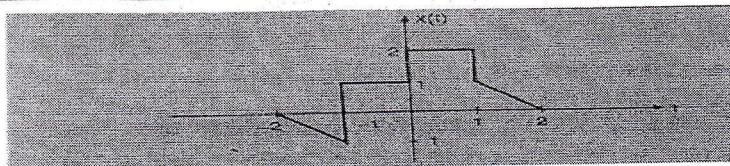
Course Code:EXC404 and Course Name: Signals and Systems

Date of Exam: 26/05/2025

Duration: 02.5 Hours

Max. Marks: 60

04/08/2025



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 $[d^2y(t)/dt^2] + 3 [dy(t)/dt] + 2 y(t) = x(t)$. Calculate output if input $x(t) = e^{-3t} u(t)$ is applied to system using Fourier transform.	4	Ap
Q.4	Solve any two questions out of three. (10 marks each)	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
