

UNIT WISE QUESTION BANK

S NO	Short Answer Questions	Blooms Taxonomy Level	Course Outcome
UNIT-IV			
	Laplace Transforms		
1	What is the use of Laplace transform?	Knowledge	4
2	What are the types of Laplace transform?	Knowledge	4
3	Define Bilateral and unilateral Laplace transform.		4
4	Define inverse Laplace transform.	Understand	4
5	Region of convergence of the Laplace transform	Knowledge	4
6	What are the Properties of ROC?	Understand	4
7	What is the relation between the Laplace transform and Fourier transform?	Understand	4
8	What is pole zero plot.	Understand	4
9	Find the Laplace transform of standard signals.	Understand	4
10	State initial value theorem and final value theorem for Laplace transform	Understand	4
11	State the linearity property for Laplace transforms.	Understand	4
12	State the time shifting property for Laplace transforms.	Understand	4
13	Z transforms		
14	Define Z transform.	Understand	4
15	What are the two types of Z transform?	Understand	4
16	Define unilateral Z transform.	Understand	4
17	What is the relation between discrete time Fourier transform and z- transform	Understand	4
18	What is ROC of Z-transform?	Knowledge	4
19	State convolution property of Z transforms.	Understand	4
20	What is the differentiation property in Z domain	Understand	4
21	State multiplication property in relation to Z transform	Understand	4
22	What is the time shifting property of Z transform?	Understand	4
23	State the methods to find inverse Z transform	Understand	4
	Long Answer Questions		
1.	What is ROC? Discuss about ROCs of various classes of signals. Write the properties of ROC for Laplace transforms.	Understand	4
2.	Compare Laplace and Fourier transforms.	Understand	4
3.	Find the Laplace Transforms of the following functions a) exponential function b) unit step function c) hyperbolic sine & cosine d) damped sine and cosine e) damped hyperbolic cosine & sine f) Impulse function g) ramp function h) parabolic function i) sine and cosine functions	Understand	4
4.	State and prove the properties of Laplace transform		
5.	Determine the function of time $x(t)$ for each of the following Laplace transforms and their associated region of convergence i) $(s+1)^2/s^2-s+1$ $\text{Re}[s] > 1/2$	Understand	4

	ii) $s^2 - s + 1 / (s + 1)$ $\text{Re}[s] > -1$		
6.	Consider the following signals, find Laplace transform and region of convergence for each signal a) $e^{-2t} u(t) + e^{-3t} u(t)$ $e^{-4t} u(t) + e^{-5t} \sin 5t u(t)$	Understand	4
7.	Determine the function of time $x(t)$ for each of the following Laplace transforms a) $1/s^2 + 9$ $\text{Re}[s] > 0$; b) $s/s^2 + 9$ $\text{Re}[s] < 0$ $(s+1)/(s+1)^2 + 9$ $\text{Re}[s] < -1$	Knowledge	4
8.	Determine the Laplace transform and associated region of convergence for each of the following functions of time $x(t) = 1; 0 \leq t \leq 1$ iii) $x(t) = \cos \omega t$	Understand	4
9.	Find the inverse Laplace transform of the functions i) $Y(s) = 10s / (s+2)^2 (s+8)$ $Y(s) = 10s / (s+2)^3 (s+8)$	Understand	4
10.	Find the inverse Laplace transform of the functions i) $Y(s) = 2s^2 + 6s + 6 / (s+2)(s^2 + 2s + 2)$ $Y(s) = s^4 + 5s^3 + 12s^2 + 7s + 15 / (s+2)(s^2 + 1)^2$	Understand	4
11.	A certain function $f(t)$ is known to have a transform $F(s) = 6s^2 + 8s + 5 / (s^2 + 6s + 5)$, find $f(t)$ find also values of $f(t)$ at $t=0$ and $t=\infty$	Understand	4
12.	Find $x(t)$ if $X(s) = 1/(s^2 + a^2)^2$ using convolution	Understand	4
13.	For an initially inert system, the impulse response is $(e^{-2t} + e^{-t}) u(t)$. find the excitation to produce an output of $t \cdot e^{-2t} u(t)$	Understand	4
14.	Find the Laplace transform of the following function , $x(t) = (1/t) \sin^2 \omega t$	Understand	4
15.	Find the Laplace Transform of $\cos \omega t$ and $\sin \omega t$ using frequency shifting property	Knowledge	4
16.	Determine the Laplace transform and associated region of convergence and pole-zero plot for the following function of time. $x(t) = e^{-2t} u(t) + e^{3t} u(t)$	Knowledge	4
17.	Verify Parseval's theorem for the energy signal $x(t) = e^{-at} u(t)$, $a > 0$	Apply	4
18.	Find the power for the following signals i) $A \cos \omega t$ $a + f(t)$, a is a constant and $f(t)$ is a power signal with zero mean	Understand	4
19.	Find the z-transform of the following sequences i) $x[n] = a^{-n} u[-n-1]$ $x[n] = u[-n]$ iii) $x[n] = -a^n u[-n-1]$	Understand	4
20.	Compare Fourier, Laplace and Z-transforms	Understand	4
21.	What are the ROCs of finite duration sequences? Write the properties of ROC of $X(z)$	Understand	4
22.	Constraints on ROC for various classes of signals?	Apply	4
23.	A finite series sequence $x[n]$ is defined as $x[n] = \{5, 3, -2, 0, 4, -3\}$. find $X[z]$ and its ROC.	Understand	4
24.	Find the z-transform of the following	Understand	4

	i) $x[n] = \cos n\omega$. $u[n]$ ii) $x[n] = a^n \sin n\omega$. $u[n]$ iii) $x[n] = a^n u[n]$		
25.	Find the z-transform of the following i) $x[n] = \cos n\omega$. $u[n]$ ii) $x[n] = a^n \sin n\omega$. $u[n]$ iii) $x[n] = a^n u[n]$	Understand	4
26.	Find the z-transform and ROC of the following sequences i) $x[n] = [4(5^n) - 3(4^n)] u[n]$ ii) $(1/3)^n u[-n]$ iii) $(1/3)^n [u[-n] - u[n-8]]$	Understand	4
27.	State and prove Properties of Z-transforms?		4
28.	Find the inverse Z-transform of $X(z) = \frac{z}{z(z-1)(z-2)^2}$; $ z > 2$ using partial fraction	Apply	4
29.	Find the inverse z-transform of $X(z) = \frac{(z-1)^2}{z^2 - 0.1z - 0.56}$		