**1**. Compute the Laplace transform of e-10tcos(3)u(t).

**2.** Compute the z-transform of the discrete time signal defined by:

x[n] = δ[n] + 5δ[n - 1]

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| **3.** Compute the inverse Laplace transform of X(s) = | s+2s2+7s+12 |

**4.** Determine if the signal given is linear, time-invariant, causal, and/or memoryless.

y(t) = [sin(6t)]x(t)

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| **5.** A continuous time signal x(t) has the Fourier transform | X(ω) | = | 1jω+b |

where b is a constant. Determine the Fourier transform for v(t) = x(5t - 4).

**6.** Compute the unit-pulse response h[n] for the discrete-time system

y[n + 2] -2y[n + 1] + y[n] = x[n] (for n= 0, 1, 2, 3)

**7.** Determine the inverse DTFT of X(Ω) = sin(Ω)cos(Ω).

**8.** Determine if the signal given is linear, time-invariant, causal, and/or memoryless.

y(t) = dx(t)

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| **9.** Determine if x(n) = cos ( | πn4 | )cos( | πn4 | ) | is periodic;  |

if periodic, calculate the period.

**10.** Compute the DTFT of the discrete-time signal x[n] = (0.8)nu[n].

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| **11.** Compute the impulse response h(t) for | dy(t)dt | - | 3y(t) = x(t). |

**12.** Compute the inverse Fourier transform for X(ω) = sin23ω.

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| **13.** Determine if x(t) = cos(3t + | π4 | ) |

is periodic; if periodic, calculate the period.

**14.** Determine if the linear time-invariant continuous-time system defined is stable, marginally stable, or unstable.

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| s - 1s2 + 4s + 5 |

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| **15.** For a discrete-time signal x[n] with the DTFT | X(Ω) | = | 1ejΩ+ b |

where b is an arbitrary constant, compute the DTFT V(Ω) of v[n] = x[n - 5].

**16.** For the RC circuit shown in the figure, find the input/output differential equation.



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| **17.** Solve the differential equation | dy(t)dt | + | 2y(t) = x(t);  |

where x(t) = u(t), and y(0) = 4.

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| **18.** Solve the differential equation | d2y(t)dt2 | + | 3 | dy(t)dt | +2y(t) = 0, y(0) = 1, y(0) = 0. |

**19.** Compute the Fourier Transform for the convolution of sin(2t)\*cos(2t) .

**20.** Use the Laplace Transform to compute the solution to the differential equation

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| defined by  |  dydt | + | 2y = u(t) where y(0) = 0. |