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Daffodil International University

Department of Electrical and Electronic Engineering
Faculty of Engineering
Final Examination, Fall – 2025

Course Code: EEE-0714-217 | Course Title: Continuous Signals & Linear Systems
Section: A, B, C, D, E | Level-Term: L2-T1 | Teacher's Initial: MFI
Full Marks: 40 | Exam Date: December 24, 2025 | Time: 2 Hours

Answer all the following Questions

Q1. **Find** the Laplace transform $X(s)$ and sketch the pole-zero plot with the ROC for the signal $x(t) = e^{-2t}u(t) + e^{-3t}u(t)$. CO-2 C(4) [8]

Q2. Consider the *RC* circuit shown in Fig. 1. The switch is closed at $t = 0$. Assume that there is an initial voltage on the capacitor and $v_c(0^-) = v_0$. (i) **Find** the current $i(t)$ and the voltage across the capacitor $v_c(t)$. CO-2 C(4) [8]

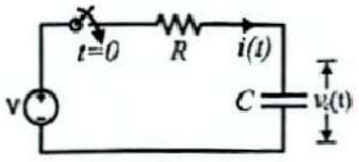


Fig. 1. RC circuit

Q3. Consider the periodic square wave $x(t)$ shown in Fig. 2. **Determine** the complex exponential Fourier series and the trigonometric Fourier series of $x(t)$. CO-2 C(5) [8]

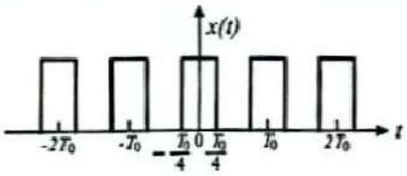


Fig. 2. Periodic square wave

Q4. Consider a continuous-time LTI system described by $\frac{dy(t)}{dt} + 2y(t) = x(t)$. Using the Fourier transform, **find** the output $y(t)$ to each of the input signals: (i) $x(t) = e^{-t}u(t)$ (ii) $x(t) = u(t)$. CO-2 C(4) [8]

Q5. **Derive** state variable matrices for the continuous time LTI system given in Fig. 3. CO-2 C(6) [8]

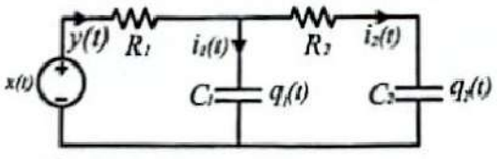


Fig. 3. Continuous time LTI system

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