Daffodil International University

Department of Electrical and Electronic Engineering
Faculty of Engineering

Final Examination, Spring – 2026

Course Code: EEE-0714-217	Course Title: Continuous Signals & Linear Systems	
Section: A, B, C, D	Level-Term: L2-T1	Teacher's Initial: MFI
Full Marks: 40	Exam Date: April 29, 2026	Time: 2 Hours

Answer all the following Questions

The second right most column indicates the course outcomes with respective Bloom's level and right most column indicates the allocated marks

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 $v_c(0^-) = v_0$. Using the transform network technique, **Find** the current $i(t)$ and the voltage across the capacitor $v_c(t)$. CO-2 C(4) [8]

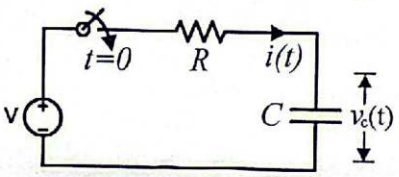

Fig. 1. RC circuit

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(4) [8]

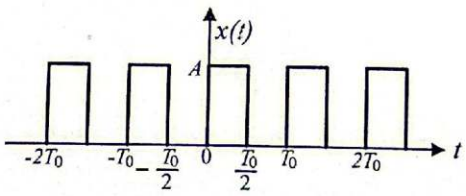

Fig. 2. Periodic square wave

Q4. Consider a continuous-time LTI system described by $\frac{dy(t)}{dt} + 2y(t) = x(t) + \frac{dx(t)}{dt}$. 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(4) [8]

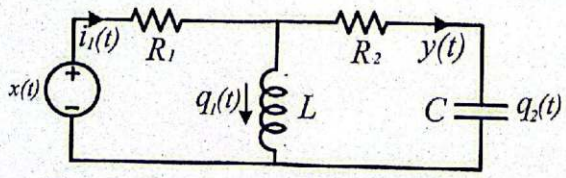

Fig. 3. Continuous time LTI system