Daffodil International University

Department of Electrical and Electronic Engineering

Faculty of Engineering

Final Examination, Summer – 2026

Course Code: 0714-217 | Course Title: Continuous Signals & Linear Systems

Section: A, B, C, D, E, F, G | Level-Term: L2-T1 | Teacher's Initial: MFI, SRH

Full Marks: 40 | Exam Date: August 22, 2026 | Time: 2 Hours

Answer all the following Questions

Q1. **Determine** the Laplace transform $X(s)$ and **illustrate** the pole-zero plot with the ROC for the signal $x(t) = e^{-3t}u(t) + e^{2t}u(-t)$. CO-2 C(3) [5]

Q2. Consider the *RC* circuit shown in Fig. 1. The switch is closed at $t = 0$. Assume that there is no initial voltage on the capacitor. Using Laplace transform **determine** the step response of the following circuit. CO-2 C(4) [5]

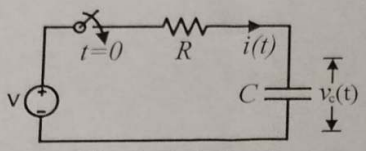

Fig. 1. RC circuit

Q3. The output y(t) of a continuous time LTI system is found to be $2e^{-3t}u(t)$ when the input is a unit step function. Using Laplace transform **Determine** the output y(t) when the input x(t) is changed to $e^{-t}u(t)$. CO-2 C(4) [5]

Q4. 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) [5]

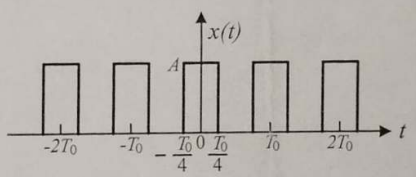

Fig. 2. Periodic square wave

Q5. If $h_1 = e^{-2t}u(t)$ and $h_2 = 2e^{-t}u(t)$ then **determine** the overall impulse response h(t) for the continuous time LTI system given in Fig. 3. CO-2 C(4) [5]

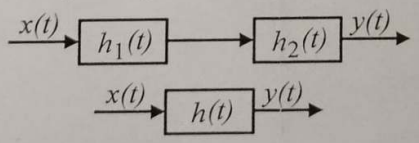

Fig. 3. A continuous time LTI system

Q6. Consider a continuous-time LTI system described by $\frac{dy(t)}{dt} + 2y(t) = x(t) + \frac{dx(t)}{dt}$. **Determine** the: (i) transfer function (ii) frequency response (iii) impulse response of this system. CO-2 C(4) [5]

Q7. **Find** the Fourier transform of the rectangular pulse signal x(t) given in Fig. 4. CO-2 C(4) [10]

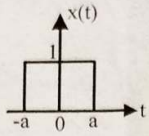

Fig. 4. Rectangular pulse signal

Then using duality property **determine** the Fourier transform of the signal x(t)= $\frac{sinat}{\pi t}$