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Daffodil International University

Department of Electrical and Electronic Engineering

Faculty of Engineering

Midterm Examination, Spring-2026

Course Code: 0541-123 | Course Title: Ordinary and Partial Differential Equation

Section: A, B, C, D, E, F, G | Level-Term: L1-T2 | Teacher's Initial: SDN, TRS, IJM

Full Marks: 25 | Exam Date: February 24, 2026 | Time: 1.5 Hours

[Answer all the following questions sequentially]

[The second right-most column indicates the COs with the respective Bloom's level]

[The right-most column indicates the assigned marks]

Q1.	(a) **Explain** the general solution and the particular solution of differential equation.	CO-1 C(2)	3
	(b) **Identify** the order, degree, and linearity or nonlinearity of the following differential equation with justification.	CO-1 C(2)	3
	(i) $3\frac{d^2y}{dx^2} + 5\frac{dy}{dx} - 3y = cosy$ (ii) $\sqrt{1+\frac{d^2y}{dx^2}} = x\frac{dy}{dx}$		
	(c) **Express** $xy = Ae^{2x} + Be^{-2x}$ in the form of an ordinary differential equation.	CO-1 C(2)	2
Q2.	(a) **Solve** the following differential equation.	CO-2 C(3)	9
	(i) $\frac{dy}{dx} = \sin(x-y+5)$ (ii) $\frac{dy}{dx} = \frac{x+2y}{2x+y}$		
	(iii) $\sec^2 x\ coty\ dx = cosec^2 y\ tanx\ dy$		
Q3.	(a) The potential difference V, between the plates of a capacitor C charged by a steady voltage E through the resistor R is given by the equation $CR\frac{dV}{dt} + V = E$.	CO-3 C(3)	4
	(i) **Build** the solution of the equation for V, given that at $t = 0$, $V = 0$.		
	(ii) **Compute** V, when $E = 25\ V$, $C = 20 \times 10^{-6}\ F$, $R = 200 \times 10^3\ \Omega$ and $t = 3\ s$.		
	(b) An RL circuit has an emf given by $3sin2t$ volts, a resistance of 10 Ω, an inductance of 0.5 henry, and an initial current of 6 amperes. **Compute** the current in the circuit at any time t.	CO-3 C(3)	4

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