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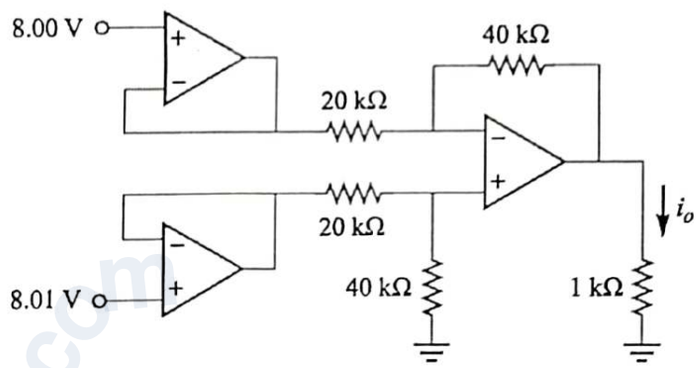
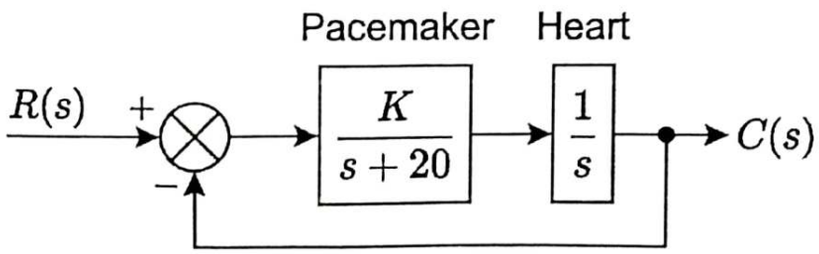
Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Summer 2026
Course Code: CSE325, Course Title: Instrumentation and Control
Level: 4 Term: 1 Batch: 65

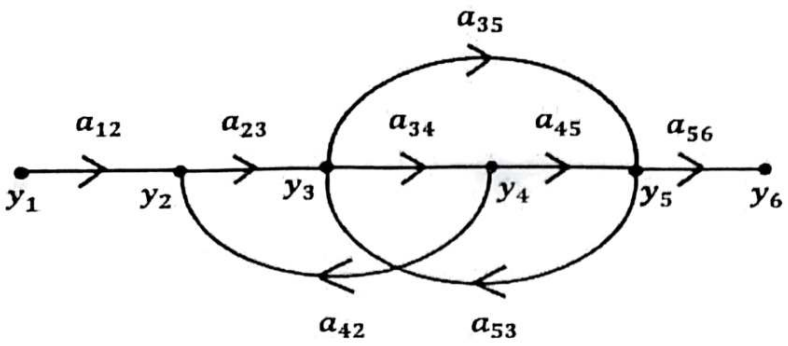
Time: 02:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	***a)***	Define source and sink node.	**2**	**CO1**
	b)	Explain the error of a type '2' system with unit ramp and unit parabolic input.	**2**	
2.	***a)***	Apply the concepts of sampling, quantization, and encoding to explain the conversion of an analog signal into a digital signal in a digital measurement system.	**6**	**CO2**
	b)	The circuit shown below uses operational amplifiers to process two closely spaced input voltages (8.00 V and 8.01 V). Identify the output current i_o through the 1 kΩ load resistor. 	**6**	
	c)	Apply the working principle of an electro-mechanical pressure measurement system to show how applied pressure is changed into mechanical movement and then into an electrical signal using a suitable transducer.	**6**	
3.	***a)***	The block diagram of an electronic pacemaker is given in the figure below. Identify the steady state error for unit ramp input when K = 300 and select the value of K for which the steady state error to a unit ramp will be 0.056 	**6**	**CO3**

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b)	Solve the signal flow graph using Mason's Gain formula to find the ratio of Y_6/Y_1 	**6**
c)	Apply Routh-Hurwitz criterion to the following equation and investigate the stability. $$s^5 + s^4 + 2s^3 + 2s^2 + 3s + 5 = 0$$	**6**

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