Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Midterm Examination, Spring 2026

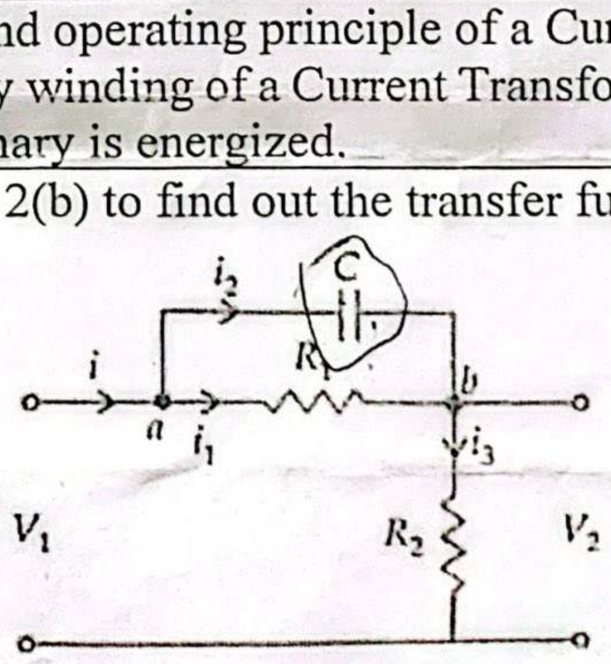
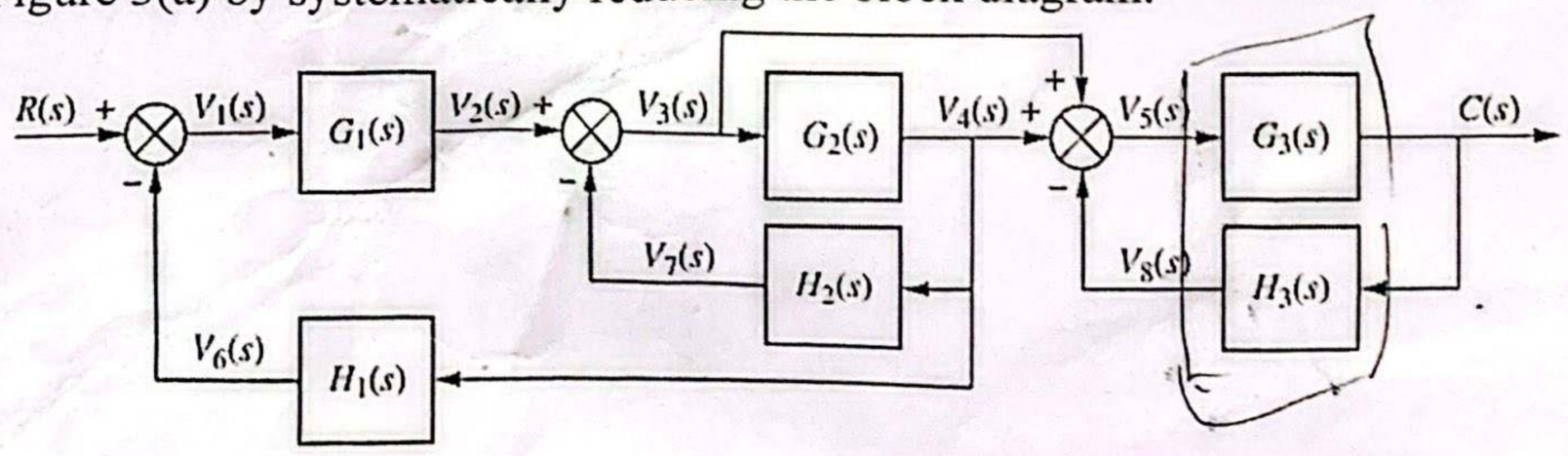
Course Code: CSE 325, Course Title: Instrumentation and Control

Level:4 Term:1 Batch:64

Time: 1:30 Hrs **Marks: 25**

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)***	Differentiate between active sensors and passive sensors with suitable examples.	**[1]**	**CO1**
	b)	State meter loading effect.	**[1]**	
	c)	Define poles and zeros of a transfer function.	**[1]**	
	d)	Recall the reasons why RTDs are preferred over thermocouples for precision measurement.	**[1]**	
	e)	List two advantages of electronic instruments.	**[1]**	
2.	***a)***	Explain the construction and operating principle of a Current Transformer (CT). Analyze why the secondary winding of a Current Transformer (CT) should never be left open while the primary is energized.	**[5]**	
	b)	Solve the circuit in Figure 2(b) to find out the transfer function, $V_2(s)/V_1(s)$.  Figure 2(b)	**[5]**	**CO2**
3.	***a)***	Design the equivalent single transfer function of the control system shown in Figure 3(a) by systematically reducing the block diagram.  Figure 3 (a)	**[5]**	**CO3**

b)	In the circuit shown in Figure 3(b), the voltage across the resistor of value 25 kΩ is to be measured using a voltmeter of sensitivity 2 kΩ/V and the range of the meter is 0-150 V. Determine the reading of the voltmeter in each case and the percentage error in the measurement.	[5]	

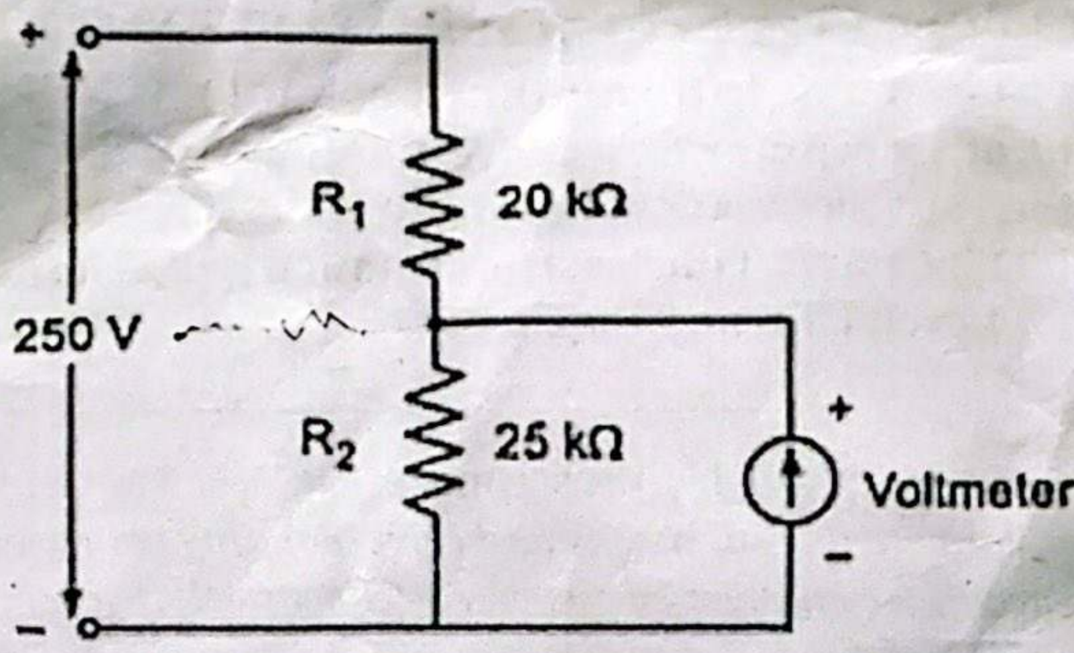


Figure 3(b)