



Roll No.															
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations - March 2026

Date: 12-03-2026

Time: 02:00pm - 03:30pm

School: SOE	Program: B.Tech. (PET)	
Course Code: PET2111	Course Name: Fundamentals of Instrumentation and Control Engineering	
Semester: IV	Max Marks: 50	Weightage: 25%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	14	12	14	10	N.A.

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

1	Differentiate between feedback control system and open loop control system (2 points only).	2 Marks	L2	CO1
2	Describe the term offset of a closed loop system.	2 Marks	L2	CO1
3	Explain the importance of measuring element in a control system.	2 Marks	L2	CO2
4	Summarize the transfer function for a first order system (only write the characteristic equation).	2 Marks	L2	CO3
5	Explain transportation lag with a suitable diagram.	2 Marks	L2	CO3

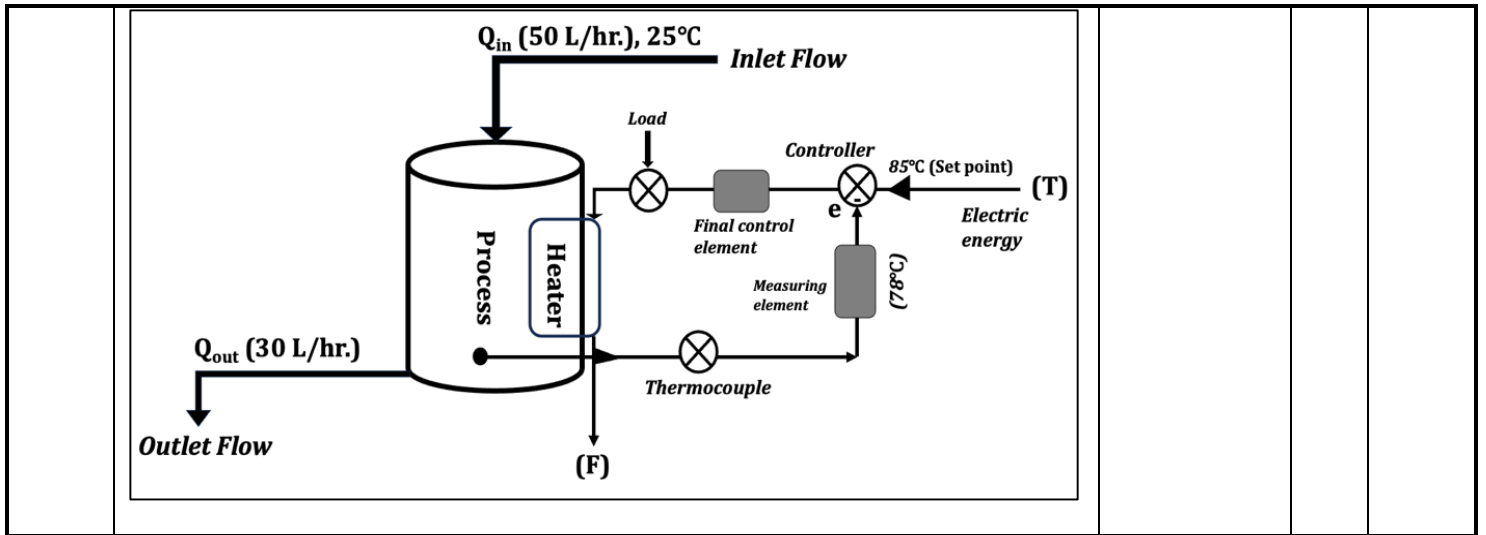
Part B

Answer the Questions.

Total Marks 40M

6.	Explain different types of controllers in a control system like P, PI, PID, and feedforward with their suitable diagram and example.	10 Marks	L2	C01
Or				
7.	Let's say one fan is rotating without having a regulator in one room (Case 1). In the next room, another fan is rotating, connected with an auto controller that can adjust the fan speed by comparing the actual speed with the set point (Case 2). From the above case studies- (a) Illustrate both the process with flow diagram. (b) Examine the transfer function for both the system.	10 Marks (5+5)	L3	C01

8.	Analyze the overall transfer function of a cascade control system with suitable diagram and example. (Take all the necessary components as per your consideration and clearly sketch the diagram)	10 Marks	L3	C02
Or				
9.	The figure is shown below represents a reactor heating process in a petroleum refinery industry. The inlet and outlet feed rate of the process is 50 and 30 L/hr., respectively. The process needs 85°C to get a desired product. Suppose, you set a heater inside the tank (see figure) by applying electric energy and fixed the set point at 85°C by using a controller. After some time, the inside tank temperature was found to be 78°C by the measuring element (as shown in figure below). Some standard symbols for the variables as given below: Set point: T Load: U Transfer function of controller: G_c Transfer function of final control element: G_1 Transfer function of process: G_2 Transfer function of measuring element: F (a) Sketch the process with block diagram according to the figure and solve the overall transfer function. (b) From the loop system determine the “error (e)” of this process.	10 Marks (5+5)	L3	C02



10.	Sketch the single tank liquid-level system with constant flow rate and solve the transfer function of that particular system only.	10 Marks	L3	C03
Or				
11.	Examine the transfer function of a mercury glass thermometer with a suitable diagram.	10 Marks	L3	C03
12.	Examine the overall transfer function for a two-tank interacting system with a suitable diagram.	10 Marks	L3	C04
Or				
13.	Calculate the Laplace transform for the function $f(t) = e^{-at}$ and $f(t) = e^{at}$ for a control system. (Do not skip any step)	10 Marks (5+5)	L3	C04