Name: **Enrolment No:**	

UPES

End Semester Examination, May 2025

Course: Process Instrumentation and Control **Semester: VIII**

Program: B.Tech Fire and Safety **Time : 03 hrs.**

Course Code: ECEG4039 **Max. Marks: 100**

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Difference between precision and accuracy in measurement? Provide a simple example.	**4**	**CO2**
Q 2	Define dynamic characteristics of measuring instruments and list any two.	**4**	**CO1**
Q 3	Signal transmission in instrumentation systems is an unnecessary component. Do you agree with this statement? Justify your answer.	**4**	**CO2**
Q 4	List any four instruments used for level measurement in process industries.	**4**	**CO1**
Q 5	Name two stability criteria used in control systems and define stability in terms of impulse response.	**4**	**CO2**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	A resistance thermometer shows incorrect readings. What could be the possible reasons for it and what are the steps you would take to rectify the same.	**10**	**CO3**
Q 7	Compare direct and indirect level measurement techniques with examples of each.	**10**	**CO2**
Q 8	Discuss the different types of errors in measuring instruments and how they influence instrument selection.	**10**	**CO2**
Q 9	Discuss with the help of a block diagram, the typical components and functions of a closed loop control system. OR The medical condition for hyperpyrexia is described as when someone is running a body temperature of more than 106.7°F. Express the level of hyperpyrexia in (a) K (b) °C (c) R	**10**	**CO2**

SECTION-C (2Qx20M=40 Marks)			
Q 10	Give the appropriate temperature sensor/instrument for the following applications, and describe its working principle with the help of a diagram. a) Temperature detector in a fire alarm requiring high sensitivity b) The sensor arrangement which can be used to provide portable power in spacecraft applications c) A furnace interior clouded with fumes d) Temperature sensing inside a reactor operating between 200-600 ^{0}C at a point which is difficult to access e) Metals being hot- worked at temperatures of about 3500 ^{o}C	**20**	**CO4**
Q 11	Design a complete instrumentation scheme to monitor temperature, pressure, and flow in a steam pipeline. Justify your choice of sensors and signal processing methods. OR With a neat sketch, explain how a pneumatic controller works. Compare its function with that of a PLC-based controller in modern plants.	**20**	**CO4**