Total number of printed pages: **2** **Programme(D)/3rd/DIE303**

2023

FUNDAMENTALS OF INSTRUMENTATION

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Draw the block diagram of an instrumentation system and explain the functional elements of the instrumentation system.	10
	b)	How the instruments can be classified? Explain.	10
2.	a)	Define the terms- Static error, Accuracy, precision, sensitivity and drift.	10
	b)	Explain the loading effect in an instrument.	10
3		Derive the input-output relation for the following and also draw its dynamic response: i. Second order instrument. ii. Zero order instrument	12+8=20
4.	a)	A set of independent current measurements were taken by six observers and were recorded as 12.8 A, 12.2 A, 12.5 A, 13.1 A, 12.9 A, and 12.4 A. Calculate- i. the arithmetic mean ii. the deviations from the mean, iii. the average deviation, iv. the standard deviation, and v. variance.	10
	b)	What are signal to noise ratio and Noise figure ?	4
	c)	Define Linearity, dead zone and dead time.	6
5.	a)	Determine the limiting errors in following combinations of quantities with limiting errors i. Sum of two quantities	5x2=10

		ii. Product of two quantities	
	b)	What are the different types of errors? Explain each type.	10
6.	a)	Define recorder. Explain X-Y recorder.	10
	b)	With the help of diagram, explain any one method for measuring the following: - i. Level ii. Pressure	5x2=10
7.	Write short notes on the followings.		10x2=20
	a)	LED	
	b)	Humidity measurement	