BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2024)

CLASS: I.M.Sc. **SEMESTER : V**
BRANCH: PHYSICS **SESSION : MO/2024**

SUBJECT: PH307 EXPERIMENTAL TECHNIQUES

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	What is the difference between Accuracy and Precision? Explain your answer with schematics.	[2]	1	1,2
Q.1(b)	What are the sources of error? Mention a few of them. What is random error?	[3]	1	1
Q.2(a)	Write down the expression for the Standard Deviation and explain the terms.	[2]	1	1,2
Q.2(b)	Consider 10 measurements of the resistance of a resistor: 101.2, 101.7, 101.3, 101.0, 101.5, 101.3, 101.2, 101.4, 101.3, and 101.1 (all the resistance values are in ohm). Assume that only the random errors are present. Calculate the standard deviation of the readings.	[3]	1	3
Q.3(a)	Define signals and systems.	[2]	2	1
Q.3(b)	With schematic, discuss the continuous time and discrete time signals.	[3]	2	2
Q.4(a)	For a common continuous time signal, define a unit step function and a unit impulse function. Draw plots to explain the answer.	[2]	2	1,2
Q.4(b)	What is the difference between the shot noise and Johnson noise? What is 1/f noise?	[3]	2	1,2
Q.5(a)	What is the probability density function of a normal distribution?	[2]	2	1
Q.5(b)	If the measurements of x and y are independent and normally distributed with centers X and Y and standard deviations σ_x and σ_y, then graphically calculate the mean value of the sum x+y. Indicate the standard deviation and the center of each distribution.	[3]	2	3

::::::23/09/2024::::::E