Roll No.

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

PhD (RM-PMS)

COURSE CODE (CREDITS): 18P1WGE101(03) MAX. MARKS: 25

COURSE NAME: Research methodologies including quantitative methods and computer applications

COURSE INSTRUCTORS: Dr. Ragini Raj Singh MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Calculators allowed

Q.No	Question	Marks
Q1	**(a)** Define measurement in physics. Explain accuracy, precision, significant figures, and propagation of error with suitable examples.	2
	(b) Explain calibration of instruments. Differentiate between systematic and random errors.	2
	(c) What is the difference between absolute error, relative error, and percentage error? Provide examples.	2
Q2	**(a)** Explain least count, instrumental errors, and error-minimization techniques.	3
	(b) A quantity ($Q = (A^2 B)/C\}\}$), where $A = 5.0 \pm 0.1$, $B = 3.0 \pm 0.2$, $C = 16 \pm 0.4$. Calculate % error in Q.	2
Q3	**(a)** Discuss the scientific method: problem identification, hypothesis, experimentation, data analysis, theory building.	3
	(b) What is plagiarism? Explain tools/methods to avoid it.	2
	(c) Describe the standard structure of a scientific research paper.	2
Q4	You are measuring the resistivity of a semiconductor. Identify: • variables, • constants, • dependent & independent parameters, • sources of systematic and random errors.	3
Q5	Design a research proposal outline for a Ph.D. study on your area of work. Include objectives, literature review pattern, methodology, and expected outcomes.	4