K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year: 2025-2026	Semester: VII
Class: FINAL	Program: B.Tech
Branch Code: CHE	Pattern: 2022
Name of Course: Research Methodology	Course Code: CHE224007
Max. Marks: 60	Duration: 2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains ___2__page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	Compare field experiments and laboratory experiments. Discuss the relevance of each type in social and physical sciences research.	(6)	CO1
Question No. 2			
2a)	Explain the different methods of data analysis and their applications in survey-based studies	(6)	CO1, CO2
Question No. 3			
3a)	Explain the general step-by-step procedure for testing a hypothesis, from stating the hypotheses to drawing a conclusion.	(8)	CO2, CO3
	OR		
3b)	Distinguish between measures of central tendency and measures of spread/dispersion, providing two examples for each.	(8)	CO2, CO3
3c)	Briefly describe the purpose of the following multivariate techniques: (i) Discriminant Analysis, (ii) Factor Analysis and (iii) Cluster Analysis	(8)	CO3
	OR		
3d)	What are non-parametric statistical techniques? Provide two examples of such tests and briefly mention when they are preferred over parametric tests.	(8)	CO2, CO3
Question No. 4			
4a)	Explain the meaning and necessity of a historical survey within the literature review process.	(8)	CO2, CO3
	OR		
4b)	Describe the essential components of a well-structured research plan.	(8)	CO2, CO3
4c)	What are the key techniques involved in data interpretation, and what precautions should be taken during this process?	(8)	CO2, CO3

OR

4d)	Differentiate between a technical report and a popular report in terms of purpose, audience, and style.	(8)	CO2, CO3

Question No. 5

5a)	What are the challenges and opportunities presented by the shift toward green technologies in academic research?	(8)	CO1, CO3

OR

5b)	Propose a framework for the effective implementation of internships and live projects involving industry professionals.	(8)	CO1, CO3
5c)	How are AI and Industry 4.0 shaping the direction of modern research?	(8)	CO1, CO3

OR

5d)	Define interdisciplinary research and explain its significance in solving complex global problems.	(8)	CO1, CO3

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