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:I
Class:FYMCA	Program:MCA
Branch Code:M.C.A.	Pattern:2024
Name of Course:Research Methodology	Course Code:2409507
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 ___TWO__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			
1 a)	Define research and identify the different types of research classified according to their application.	(6)	CO1
	OR		
1b)	Explain experimental research with an example.	(6)	CO1
1c)	Discuss the importance of sample design in research.	(6)	CO1
	OR		
1d)	Describe the different methods used to collect primary data and explain when each method is most appropriately applied.	(6)	CO1
Question No. 2			
2a)	How would you use different literature review sources for building a strong background for your research?	(6)	CO2
	OR		
2b)	How would you plan laboratory experiments for validating your research ideas?	(6)	CO2
2c)	Using public health as an example, show how you would apply research prioritization to choose the most important problem—such as low childhood vaccination rates.	(6)	CO2
	OR		
2d)	How would you frame a hypothetical proposal for improving an existing system or process?	(6)	CO2
Question No. 3			
3a)	Apply the process of simulation model formulation to design a traffic signal timing system.	(6)	CO3
	OR		
3b)	Demonstrate how graphs can be applied to model a communication network and explain each step.	(6)	CO3
3c)	Develop an ODE-based model to illustrate population growth using the logistic growth equation.	(6)	CO3

OR

3d)	Apply the classification of mathematical models to categorize a city's population growth system and justify the type of model selected.	(6)	CO3

Question No. 4

4a)	Apply the general model of a process to develop a model for a food-processing unit converting raw fruits into packaged juice.	(6)	CO4

OR

4b)	Demonstrate how dependent and independent variables apply to modelling the output of a chemical reactor.	(6)	CO4
4c)	Develop a first-order design to study the effect of temperature and pressure on fuel efficiency of an engine.	(6)	CO4

OR

4d)	Apply Taguchi parameter design to develop a robust process for smartphone battery testing.	(6)	CO4

Question No. 5

5a)	Demonstrate how classifying different data types can guide the development of an effective analysis plan for a consumer behavior study.	(6)	CO5

OR

5b)	Demonstrate how the steps for preparing a research report can be applied to present the findings of a machine learning project.	(6)	CO5
5c)	Apply error analysis techniques to evaluate accuracy of experimental readings in a physics experiment.	(6)	CO5

OR

5d)	How would be you use the interpretation techniques to analyse statistical results in a research study.	(6)	CO5

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