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

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

Marking Scheme

Exam Seat No.:
End-Sem Examination-I — Winter 2025
Academic Year: 2025-26 — Sem: I
Class: F.Y — Program: MCA
Branch Code: MCA — 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

Q. No.	Details	(stepwise marks)	Max. Marks	CO No.	BT Level
Q.1	a) Define research and identify the different types of research classified according to their application. [6Marks] OR b) Explain experimental research with an example. [6Marks]	Definition – 2, Types – 3, Examples/Explanation – 1 OR Definition – 2, Steps/Features – 2, Example – 2	[12]	CO1	L2
	c) Discuss the importance of sample design in research. [6Marks] OR d) Describe the different methods used to collect primary data and explain when each method is most appropriately applied. [6Marks]	Concept – 2, Importance – 3, Example – 1 OR List of methods – 2, Explanation – 3, Appropriate usage – 1		CO1	L2
Q.2	a) How would you use different literature review sources for building a strong background for your research? [6Marks] OR b) How would you plan laboratory experiments for validating your research ideas? [6Marks]	Sources – 2, How to use – 3, Example – 1 OR Objective – 1, Steps – 3, Example – 2	[12]	CO2	L3
	c) 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. [6Marks] OR d) How would you frame a hypothetical proposal for improving an existing system or process? [6Marks]	Identify problem – 2, Steps of prioritization – 3, Justification – 1 OR Problem – 2, Proposal steps – 3, Example – 1		CO2	L3

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Q.3	a) Apply the process of simulation model formulation to design a traffic signal timing system. [6Marks] OR b) Demonstrate how graphs can be applied to model a communication network and explain each step. [6Marks]	Define system – 2, Model formulation – 3, Explanation – 1 OR Graph construction – 2, Steps – 3, Explanation – 1	[12]	CO3	L3
	c) Develop an ODE-based model to illustrate population growth using the logistic growth equation. [6Marks] OR d)Apply the classification of mathematical models to categorize a city's population growth system and justify the type of model selected. [6Marks]	Define ODE – 2, Formulate model – 3, Explain results – 1 OR Model types – 2, Categorization – 3, Justification – 1		CO3	L3
Q.4	a) Apply the general model of a process to develop a model for a food-processing unit converting raw fruits into packaged juice. [6Marks] OR b) Demonstrate how dependent and independent variables apply to modelling the output of a chemical reactor. [6Marks]	Define process – 2, Model formulation – 3, Explanation – 1 OR Define variables – 2, Application – 3, Example – 1	[12]	CO4	L3
	c) Develop a first-order design to study the effect of temperature and pressure on fuel efficiency of an engine. [6Marks] OR d) Apply Taguchi parameter design to develop a robust process for smartphone battery testing. [6Marks]	Identify factors – 2, Experimental design – 3, Explanation – 1 OR Define factors – 2, Parameter design – 3, Robustness explanation – 1		CO4	L3
Q.5	a) Demonstrate how classifying different data types can guide the development of an effective analysis plan for a consumer behavior study. [6Marks] OR b) Demonstrate how the steps for preparing a research report can be applied to present the findings of a machine learning project. [6Marks]	Data types – 2, Analysis plan – 3, Example – 1 OR Steps – 3, Explanation – 2, Example – 1	[12]	CO5	L3
	c) Apply error analysis techniques to evaluate accuracy of experimental readings in a physics experiment. [6Marks] OR d)How would be you use the interpretation techniques to analyse statistical results in a research study. [6Marks]	Identify errors – 2, Analysis – 3, Conclusion – 1 OR Identify techniques – 2, Application – 3, Example – 1		CO5	L3

****ALL THE BEST***