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Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)



Ph.D. (First Semester) Examinations, December – 2025

23SPPCRM1010 – Research Methodology

(Common to all branches except Agriculture)

Time: 3 hrs

Maximum: 70 Marks

The figures in the right-hand margin indicate marks.

Answer ANY FIVE Questions.

(14 x 5 = 70 Marks) Marks

- 1.a. Define research methodology. How does it differ from research methods? Give suitable examples. 7
- b. Discuss the importance of formulating a research problem. What are the key characteristics of a well-defined problem statement? 7
- 2.a. Explain the difference between qualitative and quantitative research approaches. Which approach is more suitable for your doctoral study, and why? 7
- b. Critically analyze the role of a literature review in academic research. How does it help in identifying research gaps? 7
- 3.a. Discuss the various methods of data collection (primary and secondary). What are the advantages and limitations of each? 14
- 4.a. Explain the difference between parametric and non-parametric tests. Under what circumstances would you prefer non-parametric methods? 7
- b. A survey was conducted among 100 people to see if there is an association between gender and preference for a new product. The results are tabulated below: 7

	Like	Dislike	Total
Male	30	20	50
Female	10	40	50
Total	40	60	100

- State the null and alternative hypotheses.
 - Calculate the expected frequencies.
 - Compute the Chi-square statistic and give your conclusion.
- 5.a. What is validity and reliability in research? Discuss how a researcher can ensure both in designing an instrument. 7
- b. Discuss the use of statistical software packages (SPSS, R, or Python) in data analysis. Which tool would you prefer and why? 7

- 6.a.

X	60	70	80	90	75	85	95	100
Y	65	68	75	85	78	82	90	95

14

- i. Calculate the Pearson correlation coefficient (r) between Math and Physics marks.

- ii. Interpret the result: Is the correlation strong, weak, or moderate? Positive or negative?
- iii. Also find the two lines of regression.

b. What is plagiarism? How can researchers avoid it? Discuss the role of plagiarism detection tools. 7

7.a. Write short notes on the following: 14

- i. Triangulation in research
- ii. Case study method
- iii. Mixed methods research
- iv. Bibliometric analysis

8.a. Elaborate on the significance of ethics in research. What are some ethical dilemmas faced by researchers in your discipline? 7

b. A researcher wants to predict the sales (in ₹1000s) of a product based on amount spent on advertising (in ₹1000s). The following data was collected over 6 months: 7

Month	1	2	3	4	5	6
Advertising (X)	2	3	5	7	9	10
Sales (Y)	4	5	7	10	15	18

- i. Fit a simple linear regression line of the form: $Y = a + b X$
- ii. Predict the sales when advertising spend is ₹8,000

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