

**RESEARCH METHODOLOGY AND IPR
(CSEN 5102)**

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Which one of the following is a non probability sampling?
(a) Stratified (b) Random (c) Quota (d) Cluster.
- (ii) Level of Significance
(a) Maximum allowable probability of Type II Error
(b) Maximum allowable probability of Type I Error
(c) Same as p-value
(d) Same as confidence coefficient.
- (iii) In hypothesis testing, the hypothesis tentatively assumed to be true is
(a) the alternative hypothesis (b) the null hypothesis
(c) either NULL of Alternative (d) none of the above is correct.
- (iv) A process by which we estimate the value of dependent variable on the basis of one or more independent variables is called
(a) Correlation (b) Regression
(c) Residual (d) Slope.
- (v) The first step in formulating a problem is
(a) statement of the problem (b) gathering of Data
(c) measurement (d) survey.
- (vi) A Research Plan may contain
(a) Research Objective (b) A problem to study
(c) Methodologies/Techniques to be adopted (d) All of the above.
- (vii) The term 'Intellectual Property Rights' covers
(a) Copyrights (b) Know-how
(c) Trade dress (d) All of the above.

- (viii) If the figure +1 signifies perfect positive correlation and the figure -1 signifies a perfect negative correlation, then the figure 0 signifies that the variables are
 (a) perfectly correlated (b) uncorrelated
 (c) insignificantly correlated (d) strongly correlated
- (ix) Partial coefficients like $r_{12.3}$, $r_{23.1}$ are called
 (a) Zero order coefficients (b) First order coefficient
 (c) Second order Coefficient (d) None of the Above.
- (x) A measure of the strength of the linear relationship that exists between two variables is called
 (a) Slope (b) Intercept
 (c) Correlation coefficient (d) Regression.

Fill in the blanks with the correct word

- (xi) Type I error in testing of hypothesis means _____.
- (xii) Difference between Primary and Secondary data is _____.
- (xiii) Survey is _____.
- (xiv) ANOVA stands for _____.
- (xv) Practice of taking someone else's work or ideas and presenting them off as one's own is known as _____.

Group - B

2. (a) What do you understand by the term “research”? [[CO1](Remember/LOCQ)]
 (b) What is the difference between the terms “Research Methods” and “Research Methodology”? [[CO1](Understand/LOCQ)]
 (c) Compare and contrast Quantitative vs. Qualitative Research Methodology. [[CO1](Understand/IOCQ)]
3 + 4 + 5 = 12
3. (a) Compare and contrast Conceptual versus Empirical Research with suitable examples. [[CO2](Understand/IOCQ)]
 (b) State the differences between Census Survey and Sample Survey. [[CO3](Understand/LOCQ)]
 (c) What is data? Differentiate between Primary and Secondary Data. [[CO3](Understand/LOCQ)]
5 + 4 + (1 + 2) = 12

Group - C

4. (a) What are the steps that we need to follow for problem identification? [[CO4](Remember/IOCQ)]
 (b) What are the criteria for prioritizing problem for research? How do you determine which algorithm is better? [[CO5](Understand/IOCQ)]
 (c) What are the ways of Data Collection? [[CO2](Apply/LOCQ)]
5 + (3 + 2) + 2 = 12

5. (a) What is the role of simulation software in conducting research? [[CO4](Understand/LOCQ)]
 (b) State a few scenarios with reasons where simulation is the best way of testing an algorithm. [[CO4](Apply/IOCQ)]
 (c) How does simulation help in determining which algorithm is better? [[CO4](Apply/IOCQ)]
5 + 5 + 2 = 12

Group - D

6. (a) Prove that $\sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}} = \sqrt{\frac{\sum_{i=1}^n x_i^2}{n}} - \bar{x}$. [[CO1](Analyse/HOCQ)]
 (b) In a random sample of 100 men are taken from a village A, 60 were found to be consuming medicine-1. In other sample of 200 men are taken from village B, 100 were found to be consuming medicine-1. Do the two villages differ significantly in respect of the proportion of men who consume medicine-1? [[CO4](Analyse/HOCQ)]
 (c) Find the mean and standard deviation of the following data:

No. of orders	Frequency
10 – 12	4
13 – 15	12
16 – 18	20
19 – 21	14

[[CO1](Understand/LOCQ)]
3 + 5 + (2 + 2) = 12

7. (a) For Quantitative research which types of Statistical measures are used? Calculate the correlation coefficient of the given data.

A	12	18	15	27	21
B	2	6	4	12	8

[[CO1](Analyse/IOCQ)]

- (b) On the basis of observations made on 39 cotton plants, the total correlation of yield of cotton (X1), number of balls i.e seed vessels(X2) and height(X3) are found to be $r_{12}=0.8$, $r_{13}=0.65$ and $r_{23}=0.7$. Compute partial correlation coefficient between yield of cotton and the number of bolls, $r_{12.3}$ eliminating the effect of height. [[CO3](Remember/HOCQ)]
 (c) Differentiate T-Test from Z-Test. [[CO5](Apply/IOCQ)]
4 + 4 + 4 = 12

Group - E

8. (a) Why is it necessary to check plagiarism before publishing a research paper? [[CO5](Remember/LOCQ)]
 (b) What is intellectual property? [[CO5](Remember/LOCQ)]
 (c) Explain any two types of intellectual property in brief. [[CO5](Remember/LOCQ)]
4 + 4 + (2 × 2) = 12
9. (a) What is Patent? What are the different types of patent that you know? [[CO6](Understand/HOCQ,LOCQ)]

- (b) Draw the bar chart and pie chart for the following data: The height of students of classes 9 and 10 in a school, divided in five categories.

Category	I (Below 4 ft)	II (Between 4 ft & 5 ft)	III (Between 5 ft & 5.5 ft)	III (Between 5.5 ft & 6 ft)	V (above 6 ft)
No. of std	30	100	120	70	40

[(CO6)(Analyse/HOCQ)]

$$(3 + 3) + (2 + 4) = 12$$

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	44.79	36.45	18.75

Course Outcome (CO):

On completion of the course the students undergoing this course are able to:

- CO1. Understand some basic concepts of research and its methodologies
- CO2. Identify appropriate research topics
- CO3. Select and define appropriate research problem and parameters
- CO4. Prepare a project proposal (to undertake a project)
- CO5. Organize and conduct research (advanced project) in a more appropriate manner
- CO6. Write a research report and thesis.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.