

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

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 5 (five) from Group B to E, taking at least one from each group.*

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

**Group - A  
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) In a symmetrical distribution  $Q_1=24$  and  $Q_3=32$ , Median of the distribution is  
(a) 28                      (b) 24                      (c) 32                      (d) 12
  - (ii) The \_\_\_\_ is the value below which half of the values in the sample fall.  
(a) mean                      (b) median                      (c) mode                      (d) standard deviation
  - (iii) Partial coefficients like  $r_{12.3}$ ,  $r_{23.1}$  are called  
(a) Zero order coefficient                      (b) First order coefficient  
(c) Second order coefficient                      (d) None of the above
  - (iv) Data collection can be done from  
(a) Kaggle                      (b) Sensors  
(c) a, b                      (d) None of the above
  - (v) Following is a type of probability sampling  
(a) Simple random Sampling                      (b) Stratified Sampling  
(c) Systematic Sampling                      (d) All of the Above
  - (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) Sampling is advantageous as it \_\_\_\_\_  
(a) Helps in capital-saving                      (b) Saves time  
(c) Increases accuracy                      (d) Both (a) and (b)
  - (viii) The term 'Intellectual Property Rights' covers  
(a) Copyrights                      (b) Know-how  
(c) Trade dress                      (d) All of the above

- (ix) The slope of the regression line of Y on X is also called the  
(a) Correlation coefficient of X on Y                      (b) Correlation coefficient of Y on X  
(c) Regression coefficient of X on Y                      (d) Regression coefficient of Y on X
- (x) 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

**Group- B**

2. (a) What do you understand by the term "research"? [(CO1) (Understand/IOCQ)]  
(b) Compare and contrast the terms "Research Methods" and "Research Methodology". [(CO1) (Remember/LOCQ)]  
(c) What do you mean by open-ended and closed-ended questionnaires? Give examples. [(CO2)( Understand/IOCQ)]  
**3 + 5 + 4 = 12**
3. (a) What does Theoretical Computer Science mean? [(CO2) (Remember/LOCQ)]  
(b) How is a guide selected? [(CO3) (Understand/LOCQ)]  
(c) Hypothesis testing results in either accepting it or rejecting it. What is a hypothesis testing? [(CO4) (Analyze/IOCQ)]  
**3 + 3 + 6 = 12**

**Group - C**

4. (a) Give importance of Literature Survey. [(CO4,CO5) (Remember/LOCQ)]  
(b) How do we select a topic for research? [(CO3) (Analyze/HOCQ)]  
(c) Analyze the problem identification by a researcher. [(CO3) (Analyze/IOCQ)]  
**3 + 4 + 5 = 12**
5. (a) What is the role of simulation software in conducting research? [(CO4) (Understand/IOCQ)]  
(b) State a few scenarios with reasons where simulation is the best way of testing an algorithm. [(CO4) (Remember/LOCQ)]  
(c) How does simulation help in determining which algorithm is better? [(CO4)( Understand /IOCQ)]  
**5 + 5 + 2 = 12**

**Group - D**

6. (a) Differentiate Informal experimental Design from Formal Experimental Design. [(CO1) (Remember/LOCQ)]  
(b) We anticipate that there is a 15% chance that next year's stock returns for ABC Corp will be 6%, a 60% probability that they will be 8% and a 25% probability that they will be 10%. We already know the expected value of returns is 8.2% and the standard deviation is 1.249%. We also anticipate that the same probabilities and states are associated with a 4% return for XYZ Corp, a 5%

return, and a 5.5% return. The expected value of returns is then 4.975 and the standard deviation is 0.46%. Calculate the covariance and the correlation between ABC and XYZ returns. What can we conclude from the same?

[(CO5) (Analyze /HOCQ)]

- (c) Find the value of Mode from the following table. What is the Modal weight of Students in the Class? [(CO1) (Analyze/IOCQ)]

S.No	Weight(Kg.)	No of Students
1	92-96	2
2	97-111	10
3	102-106	15
4	107-111	18
5	112-116	13
6	117-121	7
7	122-126	6
8	127-131	1

$2 + 5 + 5 = 12$

7. (a) Explain any of the Sampling mechanism either of Chi-square/ F Distribution. [(CO3) (Understand/LOCQ)]
- (b) A study was carried out into the attendance rate at a hospital of people in 16 different geographical areas, over a fixed period of time. The distance of the centre from the hospital of each area was measured in miles. The results were as follows:  
(1) 21%, 6.8; (2) 12%, 10.3; (3) 30%, 1.7; (4) 8%, 14.2; (5) 10%, 8.8; (6) 26%, 5.8; (7) 42%, 2.1; (8) 31%, 3.3; (9) 21%, 4.3; (10) 15%, 9.0; (11) 19%, 3.2; (12) 6%, 12.7; (13) 18%, 8.2; (14) 12%, 7.0; (15) 23%, 5.1; (16) 34%, 4.1.  
What is the correlation coefficient between the attendance rate and mean distance of the geographical area? What does it imply? [(CO3,CO5)(Analyze /HOCQ)]

$6 + 6 = 12$

### Group - E

8. (a) What is IPR? Why do we need it? [(CO1) (Remember/LOCQ)]
- (b) Write a short note on plagiarism. [(CO6) (Remember/LOCQ)]
- $(3 + 3) + 6 = 12$
9. (a) Give the general outline of a technical report . [(CO4) (Remember/LOCQ)]
- (b) Compute the principal component for the given 2D dataset.  
 $D=(d1,d2)=\{(3,3),(3,5)(1,2),(5,4),(5,6),(6,5),(6,5),(8,7),(9,8)\}$ .  
[(CO3) (Understand/IOCQ)]
- (c) Discuss Spreadsheet as a tool for data Analysis, apply functions, formulae and plot graphs. [(CO4) (Analyze/IOCQ)]

$3 + 6 + 3 = 12$

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	43.75%	40.63%	15.62%

**Course Outcome (CO):**

After the completion of the course students will be able to

- CSEN5102.1.** Understand some basic concepts of research and its methodologies.
- CSEN5102. 2.** Identify appropriate research topics and Apply methodologies to solve or interpret.
- CSEN5102.3.** Select and define appropriate research problem and parameters
- CSEN5102.4.** Analyze data distinguish and examine experiments and undertake a project.
- CSEN5102.5.** Organize and conduct research (advanced project) by justifying decisions or critique.
- CSEN5102.6.** Write a research report and thesis by investigating formulating and developing

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

Department & Section	Submission Link
CSE	<a href="https://classroom.google.com/w/NDA1NTg4Nzk5NTly/tc/Mjl3ODkwMDUwNDA1">https://classroom.google.com/w/NDA1NTg4Nzk5NTly/tc/Mjl3ODkwMDUwNDA1</a>