

- (c) In the frequency distribution of 100 families given below: the number of families corresponding to expenditure groups 20 – 40 and 60 – 80 are missing from the table. However the median is known to be 50. Find out the missing frequencies.

Expenditure:	0-20	20-40	40-60	60-80	80-100
No. of families:	14	?	27	?	15

$$6 + 3 + 3 = 12$$

7. (a) 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?

- (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?

$$6 + 6 = 12$$

### Group - E

8. (a) What do you understand by the term plagiarism?  
 (b) What do you understand by the term "self plagiarism"?  
 (c) Can you suggest some practices to avoid plagiarism?
9. (a) What is a patent?  
 (b) What are the different types of patent that you know of?  
 (c) Write a short note on IPR.

$$3 + 3 + 6 = 12$$

$$3 + 3 + 6 = 12$$

## 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) Patent right is  
 (a) limited period exclusive right (b) a perpetual right  
 (c) always valid throughout the world (d) a fundamental right.
- (ii) In spreadsheet tools, \$ symbol is used with a cell address within a formula to  
 (a) make the cell reference relative  
 (b) hide the value of the cell  
 (c) make the cell reference absolute  
 (d) display the formula of the cell.
- (iii) Research and Development(R&D) becomes the index of development of a country. Which of the following reasons are true with regards to this statement?  
 (a) Because R&D reflect the true economic and social conditions prevailing in a country  
 (b) Because R&D targets the human development  
 (c) Because R&D can improve the standard of living of the people in a country  
 (d) All of the above.
- (iv) For metric data, when there is (are) \_\_\_\_, one-way analysis of variance (one-way ANOVA) can be used.  
 (a) only one sample  
 (b) two independent samples  
 (c) more than two independent samples  
 (d) two or more related samples.

- (v) 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.
- (vi) Failure to acknowledge the borrowed material is called  
(a) phishing (b) spoofing  
(c) misacknowledgement (d) plagiarism.
- (vii) 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.
- (viii) Which of the following is NOT the characteristic of a research?  
(a) Research is systematic (b) Research is not passive  
(c) Research is problem oriented (d) Research is not a process.
- (ix) 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.
- (x) Intellectual Property Rights (IPR) protect the use of information and ideas that are of  
(a) ethical value (b) moral value  
(c) social value (d) commercial value.

**Group - B**

- 2. (a) What do you understand by the term “research”? What is the difference between the terms “Research Methods” and “Research Methodology”?
- (b) Compare and contrast quantitative vs. qualitative research methodology.  
**(3 + 4) + 5 = 12**
- 3. (a) What are the steps involved in a research process?
- (b) State the differences between census survey and sample survey.
- (c) Compare and contrast conceptual versus empirical research with suitable examples.

**3 + 4 + 5 = 12**

**Group - C**

- 4. (a) What do you understand by the term “Literature” in context of the term “research”.

- (b) What are the different kinds of procedures to conduct a survey? Discuss each of the methods with their pros and cons.  
**4 + 8 = 12**
- 5. (a) What is the role of simulation software in conducting research?
- (b) State a few scenarios with reasons where simulation is the best way of testing an algorithm.
- (c) How does simulation help in determining which algorithm is better?  
**5 + 5 + 2 = 12**

**Group - D**

- 6. (a) There are three different basketball teams and each has played five games. You have each team's score from each of its games.

	Game 1	Game 2	Game 3	Game 4	Game 5
Jaguars	67	87	54	99	78
Wolves	85	90	44	80	46
Lions	32	101	65	88	55

- i. Suppose you want to join one of the three basketball teams. You want to join the one that is doing the best so far. If you rank each team by their mean scores, which team would you join?
- ii. Instead of using mean scores, you use the median score of each team to make your decision. Which team do you join?
- iii. Pretend you are the coach of the Lions and you were being interviewed about your team for the local newspaper. Would it be better for you to report your mean score or your median score?

- (b) The table below shows the number of skilled and unskilled workers in two localities along with their average hourly wages.

Worker Category	Ram Nagar		Shyam Nagar	
	Number	Wages (per hour)	Number	Wages (per hour)
Skilled	150	1.8	350	1.75
Unskilled	850	1.3	650	1.25

Determine the average hourly wage in each locality. Also give reasons why the results show that the average hourly wage in Shyam Nagar exceed the average hourly wage in Ram Nagar even though in Shyam Nagar the average hourly wages of both categories of workers is lower. It is required to compute weighted mean.