

Department of Psychology
Subject: Statistical Methods
(PSY-4103)
Question Bank
2019-20

◆ **Objective Questions**

1. Statistical procedures used in describing the properties of samples, as:

- (a) Inferential Statistics (b) Descriptive Statistics
(c) Parametric Statistics (d) Population Statistics

2. Statistical procedures used in the drawing of inferences about the properties of populations from sample data are frequently referred to as:

- (a) Inferential Statistics (b) Population
(c) Parametric Statistics (d) Descriptive Statistics

3. A parameter is a property descriptive of:

- (a) Sample (b) Group
(c) Crowd (d) Population

4. A property of a sample drawn at random from a population is known as:

- (a) Estimate (b) Data
(c) Statistics (d) Scores

5. A psychologist wants to make a statement about the mean IQ in the complete population of students in a particular university from knowledge of the mean completed on the sample of 100 and to estimate the error involved in this statement. For this purpose, he will use procedures from:

- (a) Mathematics (b) Geometry
(c) Geography (d) Inferential Statistics

6. The branch which deals with collection, analysis and interpretation of numerical data obtained by conducting a survey or an experimental study is known as:

- (a) Psychology (b) Statistics
(c) Sociology (d) Mathematics

7. The branch of mathematical statistics which deals with measurement of the extent of certainty of events whose occurrence depends on chance is popularly known as:

- (a) Variable
- (b) Probability
- (c) Correlation
- (d) Measures of Central Tendency

8. A fraction of a population drawn by using a suitable method so that it can be regarded representative of the entire population is known as:

- (a) Variable
- (b) Estimate
- (c) Group
- (d) Sample

9. When the number of individual members is finite, it is known as:

- (a) Sample
- (b) Finite population
- (c) Infinite population
- (d) Group

10. We study the properties of a population in terms of some:

- (a) Variable
- (b) Data
- (c) Scores
- (d) Scales

11. The numerical quantities which characterize a population are called:

- (a) Parameters
- (b) Statistics
- (c) Data
- (d) Scores

12. Discrete variable is otherwise known as:

- (a) Discontinuous variable
- (b) Continuous variable
- (c) Qualitative variable
- (d) Scores

13. A variable which can theoretically assume all values within a certain interval and as such are divisible into smaller and smaller fractional units is known as:

- (a) Discrete Variable
- (b) Continuous Variable
- (c) Qualitative variable
- (d) Score

14. The variable which shows variation in objects not in terms of magnitude, but in quality or kind is popularly known as:

- (a) Quantitative variable
- (b) Qualitative variable
- (c) Score
- (d) Continuous variable

15. Sex, nationality, occupation, religion, marital status are examples of:

- (a) Quantitative variable
- (b) Qualitative variable
- (c) Discontinuous variable
- (d) Continuous variable

16. The Scale, where absolute zero point is known, is popularly known as:

- (a) Ordinal Scale
- (b) Ratio Scale
- (c) Interval Scale
- (d) Nominal Scale

17. Weight, length, time and speed are some variables which can be measured on:

- (a) Ratio Scale
- (b) Interval Scales
- (c) Nominal Scales
- (d) Ordinal Scales

18. The scales where the absolute zero point is unknown are termed as:

- (a) Interval scales
- (b) Ratio Scales
- (c) Nominal Scales
- (d) Ordinal Scales

19. A table which contains data on two characteristics is called a:

- (a) Bivariate table
- (b) Simple Table
- (c) Univariate Table
- (d) Complex Table

20. When the data are depicted pictorially or graphically, we call it:

- (a) Graphical Presentation of the Data
- (b) Mathematical Presentation of Data
- (c) A picture
- (d) A geometric figure

21. A set of rectangles whose arcs were in Proportion to class frequencies is known as:

- (a) polygon
- (b) Histogram
- (c) Ogive
- (d) Cumulative Frequency Curve

22. If a curve has a long tail on right side, it is called:

- (a) A positively skewed curve
- (b) A negatively skewed curve
- (c) An Ogive
- (d) A smoothed curve

23. Ranking order or Merit position is involved in:

- (a) Interval Scale
- (b) Ordinal Scale
- (c) Interval Scale
- (d) Ratio Scale

24. Rank order co-efficient of correlation can be easily calculated when the data are in:
- (a) Interval Scale
 - (b) Ratio Scale
 - (c) Nominal Scale
 - (d) Ordinal Scale
25. Centigrade thermometers and scores on intelligence test come under:
- (a) Ordinal Scale
 - (b) Interval Scale
 - (c) Ratio Scale
 - (d) Nominal Scale
26. In Psychology and Education, we come across measurement data heavily dependent upon:
- (a) Nominal Scale
 - (b) Ordinal Scale
 - (c) Interval Scale
 - (d) Ratio Scale
27. Which scale has a true zero point and constitutes the highest type of scale in terms of measurement?
- (a) Nominal Scale
 - (b) Ordinal Scale
 - (c) Interval Scale
 - (d) Ratio Scale
28. Grouped data or Frequency Distribution may be represented graphically through
- (a) Histogram
 - (b) Polygon
 - (c) Cumulative Frequency graph
 - (d) All of the above
29. Which one is the simplest but most useful measure of central tendency?
- (a) Median
 - (b) Arithmetic Mean
 - (c) Mode
 - (d) None of these
30. The point on the score scale which 50 per cent of the scores fall is called:
- (a) Mean
 - (b) Mode
 - (c) Median
 - (d) None of the above
31. When the group is made up of individuals of nearly the same ability it is called:
- (a) Homogeneous
 - (b) Heterogeneous
 - (c) Complex
 - (d) None of the above

32. The interval between the highest and the lowest score is popularly known as:

- (a) Range
- (b) S.D.
- (c) Quartile Deviation (Q)
- (d) Mean Deviation (A.D.)

33. If the highest score is 89 and the lowest score is 19, the range (R) is:

- (a) 62
- (b) 64
- (c) 65
- (d) 70

34. The one-half of scale distance between the 75th and 25th percentiles in a frequency distribution is known as:

- (a) Range
- (b) Standard Deviation
- (c) Quartile Deviation
- (d) Average Deviation

35. The most stable index of variability is:

- (a) Average Deviation
- (b) Standard Deviation
- (c) Range
- (d) Median

36. The measure of variability which is customarily employed in experimental work and in research studies is:

- (a) Standard Deviation
- (b) Average Deviation
- (c) Median
- (d) Range

37. The measurement of variability which we use as a unit of the scale of measurement in a normal distribution is:

- (a) A.D
- (b) Standard Deviation
- (c) Range
- (d) Quartile Deviation

◆ One Sentence Questions

1. What is mean by statistics?
2. What is the difference between a discrete and a continuous variable?
3. What is a frequency table?
4. Why do researchers make histograms?
5. What kind of skew is created by (a) a floor effect and (b) a ceiling effect?
6. Name and define three measures of central tendency.
7. Define the standard deviation.
8. How is a Z score related to a raw score?
9. Why is the normal curve?
10. List and explain two interpretations of probability.
11. Why do we say that hypothesis testing involves double negative logic?
12. What is a two-tailed test?
13. What is a non-directional hypothesis test?
14. What is a distribution of means?
15. What is the standard error?
16. How do you find the Z score for the sample's mean on the distribution.
17. What is a 95% confidence interval?
18. What is a Type I error?
19. Why do researchers usually use a *standardized* effect size?
20. What is statistical power?
21. What are the two factors that determine effect size?
22. What are degrees of freedom?
23. Describe the situation in which you would use a t test for dependent means.
24. Describe a specific assumption for a t test for dependent means.
25. When would you carry out a t test for independent means?
26. List two assumptions for the t test for independent means.
27. When can you use an analysis of variance?
28. What are post hoc comparisons?
29. In a two-way analysis of variance, what is the numerator of the F ratio for the row main effect?
30. List the steps for figuring the F ratios in a two-way factorial analysis of variance.
31. Write the formula for the effect size for rows in a two-way analysis of variance.
32. What is the difference between a linear and curvilinear correlation in terms of how they appear in a scatter diagram?
33. What are the assumptions for the significance test of a correlation coefficient?

34. What is the difference between correlation as a statistical procedure and a correlational research design?
35. Give three reasons why a researcher might choose to use Spearman's rho instead of the regular correlation coefficient.
36. What does the regression line show?
37. What is multiple regression?
38. In what situation do you use a chi-square test for goodness of fit?
39. In what situation do you use a chi-square test for independence?
40. What are the assumptions for chi-square tests?
41. Transform the following scores to ranks: 5, 18, 3, 9, 2.
42. What is partial correlation?
43. What is an analysis of covariance?
44. What is meant by non-parametric statistics?
45. List the tests of non-parametric statistics.

◆ **Short Notes**

1. Graphical representation of the data.
2. Uses of simple linear regression.
3. One-way ANOVA.
4. Rank difference correlation.
5. Tetrachoric correlation.
6. Concept of standard error of mean.
7. SPSS.
8. Standard scores.
9. Two-way ANOVA.
10. Percentiles.
11. Characteristics of normal distribution curve.
12. Biserial & Point biserial correlation.
13. Assumptions of analysis of variance (ANOVA).
14. Probability.
15. Percentile rank.
16. Non-parametric Statistics.
17. Measures of central tendency.
18. Difference between correlation & regression.
19. Difference between parametric & non-parametric statistics.
20. Measures of variability.
21. One-tailed and two-tailed hypothesis test.
22. Confidence intervals.
23. Assumptions of the t test for a single sample.
24. Assumptions of the t test for dependent means.
25. Assumptions of the t test for independent means.
26. Assumptions for Chi-Square Tests.
27. Partial Correlation.
28. Analysis of Covariance (ANCOVA).

◆ Short Answer Questions

1. Explain the concept of variance & evaluate the measures of variability.
2. Explain the Man-Whitney & Kruskal-Wallis test for uncorrelated data.
3. Explain the concept of probability & describe its approaches.
4. Evaluate the utility of graphical representation of data.
5. Given a NDC distribution with a mean of 28 & SD of 5, what percentage of scores lie between scores 28 & 31?
6. Define correlation & explain different types of correlation.
7. State the assumptions of two way ANOVA.
8. Explain meaning & uses of analysis of covariance.
9. What is meant by non-parametric statistics? Describe different types of non-parametric tests.
10. What is meant by percentile rank? Explain its uses.
11. Explain the meaning & uses of simple linear regression.
12. Given a NDC distribution with a mean of 23 & SD of 4. What percentage of scores lies between scores of 18 & 21?
13. Evaluate the measures of variability.
14. State the assumptions of one way ANOVA.
15. Describe Man-Whitney U test.
16. Given a NDC distribution with a mean of 81 & SD of 26, change the raw score 131 into Z score.
17. Explain the concept of variance & evaluate the measures of variability.
18. Explain the difference between correlation & regression & uses of regression.
19. Explain the standard error of mean.
20. Given a NDC distribution with a mean of 101.03 & SD of 34.79, change the score 71 into Z or sigma score.

◆ Long Term Questions

1. A researcher has performed a study on the effectiveness of a various methods of therapy. At the end of the study, changes in self-concept were found for each patient. The scores are as follows:

Behaviour Therapy	Psychoanalysis	Gestalt Therapy
5	4	7
7	6	11
9	3	6
6	8	7
9	3	9
6	2	2
5	5	9
7	6	11
7	7	7
9	5	6

Determine if one method is more effective than the other methods & test null hypothesis.

2. Find the Pearson's Product Movement correlation from the following scatter diagram & interpret the results.

Class Interval	5-14	15-24	25-34	35-44	45-54	55-64	65-74	Total
90-99	1			1			1	3
80-89		1	3	4	2	1		11
70-79		1	4	6	2			13
60-69		1	2	1	3			7
50-59		1		2	1	1		5
40-49					2		1	3
Total	1	4	9	14	10	2	2	42

3. Apply a suitable statistics on the following data & interpret the results:

	Favourable	Unfavourable
Athletic	38	12
Non-athletic	84	66

4. 30 subjects were randomly assigned to 3 groups. The subjects were assessed for their personality development after the intervention. Calculate a suitable statistics for following data & test a null hypothesis.

Participative Method	Lecture Method	Audio-Visual Method
29	47	17
27	41	16
12	43	12
15	51	24
23	56	28
28	52	21
26	36	22
19	48	19
12	51	29
17	43	23

5. Apply a suitable statistics on the following data & interpret the results:

	Favourable	Unfavourable
Graduate	124	136
Post-graduate	135	125

6. The following are the scores on two tests. Apply an appropriate technique to test the relationship between them.

Test A	36	42	41	46	51	52	58	39	54
Test B	12	14	13	19	16	13	11	19	21

7. Compute the coefficient of correlation from the table given below:

CI	30-34	35-39	40-44	45-49	50-54	55-59	60-64
22-24	1						
19-21		1	2				
16-18		2	3	2			
13-15		3	1	1	2		
10-12			1	1	2	2	
7-9					2	1	1
4-6					1	1	1

*X= Speed & Accuracy Y= Mechanical Aptitude

8. Two groups of students obtained the following data on an aptitude scale:

	Group I	Group II
Mean	27	32
SD	4.6	5.0
N	35	40

Test the null hypothesis at 0.05 level.

9. The table below shows the number of graduates & post graduates whose opinion on whether there should be a workshop. Apply a suitable statistics & interpret the results.

	Yes	No	Total
Graduates	31	39	70
Postgraduates	35	35	70
Total	66	74	140

10. Compute the coefficient of correlation between abstract reasoning scores & IQ shown in the table given below.

CI	98-100	101-103	104-106	107-109	110-112	113-115	116-118
120-124			1			1	1
115-119		1	2	2	1	1	2
110-114	1	3	2	3	2	4	
105-109	2	1		2			
100-104	1						

11. Two groups of students obtained the following data on an aptitude scale:

	Group I	Group II
Mean	37	32
SD	5.6	5.8
N	135	140

Test the null hypothesis at 0.05 level.

12. The table below shows the number of graduates & post graduates whose opinion on whether there should be a workshop. Apply a suitable statistics & interpret the results.

	Yes	No	Total
Graduates	39	37	76
Postgraduates	35	41	76
Total	74	78	152

13. What is percentile rank? Compute the percentiles for the scores 17, 40, 65 & 80 from the following distribution:

Scores	40-44	35-39	30-34	25-29	20-24	15-19	10-14	5-9
f	1	5	14	25	9	6	3	2

14. Subjects were randomly assigned to two groups. Those Practicing physical exercise & those practicing meditation, their scores on a depression inventory are given below. Use a suitable statistical test to verify that the groups do not differ in their scores.

Physical scores	17	10	18	11	10	15	11	16	20	14
Meditation	9	8	9	10	17	16	11	10	13	19

15. 57 mothers were asked for their opinion on whether school students should be given homework. The results are as follows:

Always	Sometimes	Never
24	16	17

Whether these results indicate a significant trend of opinion? Using the Chi-square test find.

16. A developmental psychologist studying people in their eighties was interested in the relation between number of very close friends and overall health. The scores for six research participants follow. make a scatter diagram of the scores

X	2	4	0	3	2	1
Y	41	72	37	84	52	49

17. What is mean by the regression? Explain the assumptions & types of regression.

18. Carry out a chi-square test for independence for the following observed scores (Nominal Variable - A & B).

	Category I	Category II
Category I	10	10
Category II	50	10
Category III	10	10

19. Carry out a chi-square test for goodness of fit for each of the following studies (use the .05 level for each):

Category	Expected	Observed
I	30%	100
II	50%	100
III	20%	100

20. A researcher is studying the effect of sleep deprivation on recall. Six participants are each tested twice on a recall task, once on a day when well rested (they had plenty of sleep the night before) and once when sleep deprived (they have had no sleep for 48 hours). Here are the recall scores:

Participant	Well Rested	Sleep Deprived
A	16	5
B	18	2
C	10	10
D	7	3
E	20	16
F	10	9

Use a suitable statistical test to verify that the groups do not differ in their scores.