



The ICFAI University, Dehradun
Ph.D. Entrance Examination, 2025
IUDRET-2025
Question Booklet

STATISTICS

BOOKLET NO.: 670141

Name and Signature of Invigilators

Number of Pages in this Booklet: 07

Number of Questions in this Booklet: 50

General Instructions: -

1. Write the application number in the space provided.
2. This question booklet consists of fifty multiple-choice types of questions.
3. At the commencement of the examination, the question booklet will be given to you. In the first five minutes, you are required to open the question booklet and compulsorily examine it as below:
 - (i) To have access to the question booklet, tear off the paper seal on the edge of this cover page. Do not accept a question booklet without a sticker seal and do not accept an open question booklet.
 - (ii) Tally the number of pages and a number of questions in the booklet with the information printed on the cover page. A faulty question booklet due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be replaced immediately by a correct booklet from the invigilators within five minutes. Afterward, neither the question booklet will be replaced nor any extra time will be given.
 - (iii) After this verification is over, the OMR Sheet Number should be entered into this question booklet.
4. Each item has four alternative responses marked (A), (B), (C), and (D). You have to darken the circle as indicated below on the correct response against each item.
Example: (A) (B) ● (D) where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Sheet**. It will not be evaluated if you mark at any place other than in the circle in the OMR Sheet.
6. Rough Work is to be done in the space provided in the question booklet.
7. Before leaving the examination hall, candidate is required to return the question booklet and OMR sheet to the invigilators at the end of the examination compulsorily.
8. Use only Blue/Black Ball point pen.
9. Use of any calculator or log table etc., is prohibited.
10. There is no negative marking for incorrect answer.

Note: This question booklet contains **fifty (50)** objective-type questions, each carrying one (01) mark.

1. Which of the following is the primary objective of research?
 - (A) To develop new theories
 - (B) To evaluate existing systems
 - (C) To find solutions to problems
 - (D) All of the above

2. The first step in the research process is
 - (A) Data collection
 - (B) Formulating hypothesis
 - (C) Identifying a research problem
 - (D) Literature Review

3. Which of the following is commonly used as a measure of a journal's quality based on citation frequency?
 - (A) h-index
 - (B) Altmetric Score
 - (C) Impact factor
 - (D) i10-index

4. The term "empirical" in research refers to
 - (A) Theoretical reasoning
 - (B) Use of statistical tools
 - (C) Data based on observation or experiment
 - (D) Use of abstract concepts

5. Which of the following can best be described as a Nominal variable?
 - (A) Gender
 - (B) Rank
 - (C) Height
 - (D) Satisfaction Score

6. In a simple linear regression equation, the slope represents
 - (A) The value of the independent variable
 - (B) The change in the dependent variable for a one-unit change in the independent variable
 - (C) The average of the residuals
 - (D) The mean of the dependent variable

7. Plagiarism refers to
 - (A) Publishing in a reputed journal
 - (B) Using others' ideas or words without proper attribution
 - (C) Repeating your own research
 - (D) Reviewing others' papers

8. Which organization in India manages the Shodhganga repository?
 - (A) ICSSR
 - (B) AICTE
 - (C) UGC-INFLIBNET
 - (D) NAAC

9. Match the following:

List - I (Research Concept)	List - II (Characteristics)
a. Shodhganga	1. Repository of research proposals
b. Shodhgangotri	2. Anti-plagiarism software platform
c. ShodhShuddhi	3. Repository of Indian Ph.D. theses ,
d. DrillBit	4. Plagiarism detection tool used in India

Choose the correct answer from the options given below:

- (A) a - 3, b - 1, c - 2, d - 4
- (B) a - 1, b - 3, c - 4, d - 2
- (C) a - 3, b - 4, c - 1, d - 2
- (D) a - 2, b - 1, c - 3, d - 4

10. The null hypothesis generally represents

- (A) The researcher's assumption
- (B) The expected outcome
- (C) No effect or no difference
- (D) A proven theory

11. A researcher selects every 10th name from a list of 1,000 students. This is an example of

- (A) Cluster sampling
- (B) Systematic sampling
- (C) Convenience sampling
- (D) Stratified sampling

12. Which platform is officially promoted by the Government of India for online higher education courses?

- (A) Coursera
- (B) edX
- (C) SWAYAM
- (D) Udemy

13. A person saves ₹500 per month from his salary of ₹6,000. What is his annual expenditure?

- (A) ₹66,000
- (B) ₹60,000
- (C) ₹63,000
- (D) ₹63,500

14. If 'BOARD' is coded as 'OABRD', what will be the code for 'LEMON'?

- (A) EMOLN
- (B) ELMON
- (C) ELMNO
- (D) EOMLN

15. Which indexing service is considered essential for measuring journal quality in scientific and technical research?

- (A) Google Scholar
- (B) DOAJ
- (C) Scopus
- (D) Academia.edu

Directions 16-20: Study the following table carefully and answer questions 16–20. It consists of data on the number of research papers published by faculty members in five departments (A to E) of a university over two years: 2023 and 2024.

Department	Publications	
	2023	2024
A	50	65
B	80	70
C	45	60
D	60	90
E	55	75

16. Which department had the highest increase in publications from 2023 to 2024?
- (A) A
(B) D
(C) C
(D) E
17. What is the total number of publications made by all departments in 2024?
- (A) 340
(B) 360
(C) 370
(D) 380
18. What is the average number of publications in 2023 across all departments?
- (A) 58
(B) 56
(C) 57
(D) 55
19. What is the ratio of total publications in Department B to Department C for both years combined?
- (A) 150:105
(B) 160:115
(C) 150:110
(D) 145:105
20. Publications from Department A in 2024 are approximately what percent more than those in 2023?
- (A) 30%
(B) 28%
(C) 32%
(D) 35%
21. Which of the following is a property of the normal distribution?
- (A) It is skewed
(B) Mean = Median = Mode
(C) It is discrete
(D) Variance is negative
22. The mean and variance of a Poisson distribution are
- (A) Equal
(B) Mean > Variance
(C) Variance > Mean
(D) Not related
23. A binomial distribution with $p = 0.5$ and $n = 10$ is
- (A) Skewed left
(B) Skewed right
(C) Symmetrical
(D) Uniform
24. Which test is appropriate for comparing means of two independent large samples?
- (A) Z-test
(B) t-test
(C) Chi-square
(D) F-test

- ✓ 25. In the regression equation $Y = a + bX$, what does the coefficient b represent
- (A) The intercept value of Y
 - (B) The standard deviation of Y
 - (C) The predicted value of Y when $X = 0$
 - (D) The average change in Y for a one-unit increase in X

- ✓ 26. Multiple regression involves
- (A) One dependent and one independent variable
 - (B) Two dependent variables
 - (C) One dependent and multiple independent variables
 - (D) No dependent variable

- ✓ 27. Partial correlation measures
- (A) Total association
 - (B) Correlation after removing the effect of other variables
 - (C) Rank correlation
 - (D) Cause and effect

28. Suppose a population has high variability between subgroups but low variability within each subgroup. Which of the following sampling techniques will provide the most precise estimates?
- (A) Simple Random Sampling
 - (B) Systematic Sampling
 - (C) Stratified Random Sampling
 - (D) Cluster Sampling

- ✓ 29. If a researcher increases the confidence level from 95% to 99%, keeping all other factors constant, what will happen to the required sample size?
- (A) It will decrease
 - (B) It will remain the same
 - (C) It will increase
 - (D) It will become infinite

30. Optimum allocation differs from Neyman allocation because it also takes into account
- (A) Sample frame completeness
 - (B) Non-response rate
 - (C) Cost per observation in each stratum
 - (D) Sampling with replacement

31. The Randomized Block Design is used to
- (A) Minimize between-group variation
 - (B) Maximize within-group variation
 - (C) Control nuisance variables
 - (D) Eliminate outliers

- ✓ 32. The number of replications in a CRD should be
- (A) Fixed
 - (B) Random
 - (C) Equal for all treatments
 - (D) Based on availability

- ✓ 33. In a 2^2 factorial design, how many treatment combinations are possible?
- (A) 2
 - (B) 4
 - (C) 6
 - (D) 8

34. In a BIBD with v treatments and b blocks, the degrees of freedom for error is given by
- (A) $b - 1$
 - (B) $v - 1$
 - (C) $b - v$
 - (D) $b - 1 - (v - 1)$

- ✓ 35. In a maximization LPP, if two or more corner points give the same optimal value, the problem has
- (A) No solution
 - (B) A unique solution
 - (C) Multiple optimal solutions
 - (D) An unbounded solution

36. In a balanced transportation problem
- Total supply is less than total demand
 - Total supply is greater than total demand
 - Total supply equals total demand
 - Supply and demand must both be zero
37. A good estimator should be
- Biased
 - Inefficient
 - Consistent
 - Unreliable
38. Let X_1, X_2, \dots, X_n be a random sample from a Weibull distribution with known shape parameter k , and unknown scale parameter λ . Which of the following is a sufficient statistic for λ
- $\max(X_1, X_2, \dots, X_n)$
 - $\sum X_i$
 - $\sum X_i^k$
 - \bar{X}
39. Which of the following best describes the UMVUE of a parameter
- An estimator that is biased but has minimum variance among all estimators
 - An unbiased estimator with the smallest variance among all unbiased estimators for all values of the parameter
 - An estimator that minimizes mean squared error regardless of bias
 - An estimator that is always equal to the sample mean
40. Which of the following is an example of a composite hypothesis
- $H_0: \mu = 50$
 - $H_1: \mu \neq 50$
 - $H_0: \sigma = 10$
 - $H_1: p = 0.5$
41. The power of a test is
- Probability of Type I error
 - $1 - \text{Probability of Type II error}$
 - Significance level
 - Confidence level
42. The least squares method is used in time series to
- Identify seasonal effects
 - Fit a trend line
 - Analyze correlation
 - Smooth data
43. Crude birth rate is calculated as
- Births per 1000 population
 - Births per 100 population
 - Births per 1000 live births
 - Births per household
44. Which of the following best describes a Markov chain
- A deterministic process
 - A process that depends on past states
 - A memoryless stochastic process
 - A linear process
45. In queueing theory, arrival and service processes are often modeled using
- Deterministic distributions
 - Poisson and Exponential distributions
 - Normal distribution
 - Binomial distribution

46. In a Latin Square Design, the experimental units are arranged in such a way that

- (A) Each treatment appears only once in each row
- (B) Each treatment appears only once in each column
- (C) Each treatment appears only once in each row and each column
- (D) Treatments are randomly assigned without any restriction

47. An estimator is said to be unbiased if

- (A) It has the smallest possible variance
- (B) Its expected value equals the true parameter value
- (C) It always gives the correct value of the parameter
- (D) It minimizes the mean squared error

48. If two events A and B are independent, then which of the following is true

- (A) $P(A \cap B) = P(A) + P(B)$
- (B) $P(A \cap B) = P(A) \times P(B)$
- (C) $P(A | B) = 1$
- (D) $P(A \cup B) = 0$

49. A fair die is rolled once. What is the probability of getting an even number

- (A) $1/2$
- (B) $1/3$
- (C) $1/6$
- (D) $2/3$

50. The Chi-Square test is primarily used to

- (A) Compare means of two related samples
- (B) Test for the association between categorical variables
- (C) Estimate population variance
- (D) Compare standard deviations of two samples