

► 1.8 IMPORTANT QUESTIONS FOR EXAM

- Q. 1 Mention brief introduction of statistics.
- Q. 2 Explain the 'concept' of statistics.
- Q. 3 Mention the functions of statistics.
- Q. 4 Mention importance of statistics and uses of statistics in (i) Planning (ii) in state, (iii) in mathematics (iv) in economics (v) in industry (vi) in Astronomy (vii) in war.
- Q. 5 What are limitation of statistics ?
- Q. 6 Explain data-classification. Also mention functions and reasons for data-classification.
- Q. 7 What are different types of data classification ?
- Q. 8 What are different types of data Risk ?
- Q. 9 Explain in detail applications and rules of classification.
- Q. 10 Explain in detail with examples bases of classification.
- Q. 11 Explain meaning and importance of tabulation.
- Q. 12 Explain types of tabulation.
- Q. 13 What are advantages and difference of diagrammatic and graphic representation of data ?
- Q. 14 Mention rules for constructing diagram.
- Q. 15 Explain univariate analysis, and discuss frequency distribution with example.
- Q. 16 Explain and mention types of Bar-charts.
- Q. 17 Explain histogram. When histogram is to be used ? How to create a histogram ?
- Q. 18 Mention histogram shapes with diagram and their meanings for :
 - (i) Normal distribution (ii) Skewed distribution (iii) Bimodal distribution
- Q. 19 What is pie-chart ? Mention advantages and disadvantages of pie-chart. Mention method of construction of pie-diagram.
- Q. 20 Compare bar-chart v/s histogram.
- Q. 21 Compare histogram and bar-graph.
- Q. 22 Explain frequency polygon and explain method of constructing frequency polygon.

Difference between non-probability sampling and probability sampling	
Non-probability sampling	Probability sampling
Sample selection based on the subjective judgement of the researcher.	The sample is selected at random.
Not everyone has an equal chance to participate.	Everyone in the population has an equal chance of getting selected.
The researcher does not consider sampling bias.	Used when sampling bias has to be reduced.
Useful when the population has similar traits.	Useful when the population is diverse.
The sample does not accurately represent the population.	Used to create an accurate sample.
Finding respondents is easy.	Finding the right respondents is easy.

► 2.8 IMPORTANT QUESTIONS FOR EXAM

- Q. 1 Explain in detail primary and secondary data.
- Q. 2 Compare primary data with secondary data. Also compare internal and external data.
- Q. 3 Mention sources of data.
- Q. 4 What are types of data and methods of collecting data. Explain in detail.
 - (i) Direct personal investigation, and its merits, demerits.
 - (ii) Indirect oral investigation and its merits, demerits.
 - (iii) Information through correspondents and its demerits.
- Q. 5 Mention characteristics of a good questionnaire. Mention its merits and demerits.
- Q. 6 Mention sources of secondary data.
- Q. 7 Explain methods of collecting data :

(I) Primary data

- (i) Quantitative methods
- (iii) Barometric methods
- (v) Surveys
- (vii) Interviews
- (ix) Focus groups
- (ii) Time-series analysis
- (iv) Qualitative method
- (vi) Polls
- (viii) Delphi techniques
- (x) Questionnaire

(II) Secondary data

- (i) Internal sources and (ii) Secondary sources

Q. 8 Explain sampling and purpose of sampling.

Q. 9 What are different types of sampling ?

Explain :

- | | |
|----------------------------|-----------------------------------|
| (i) Random sampling | (ii) Stratified sampling |
| (iii) Opportunity sampling | (iv) Systematic sampling |
| (v) Cluster sampling | (vi) Multi-stage cluster sampling |

and their merits and demerits.

Q. 10 Explain (Census methods. Its merits and demerits)

Q. 11 What are advantages and disadvantages of Census-method ?

Q. 12 What is probability Sampling ?

Explain the following types of probability sampling with examples :

- | | |
|-------------------------------|---------------------------------|
| (i) Simple random sampling | (ii) Stratified random sampling |
| (iii) Random cluster sampling | (iv) Systematic sampling |

Q. 13 Mention the steps involved in probability sampling.

Q. 14 What are advantages of probability sampling ?

Q. 15 What is Non-probability sampling ?

Mention and explain types of Non-probability sampling with examples.

Q. 16 What are advantages and non-probability sampling ?

Q. 17 Explain difference between non-probability sampling and probability sampling.

Chapter Ends...



3.7 IMPORTANT QUESTIONS FOR EXAM

- Q. 1 Explain correlation and its types, with examples. Explain correlation with scatter diagram.
- Q. 2 Explain and derive Karl-Pearson's coefficient of correlation, and mention its properties.
- Q. 3 Explain regression and mention types of regression.
- Q. 4 Define lines of regression and find expression for angle between the lines of regression.
- Q. 5 Explain prediction using regression lines with diagrams.
- Q. 6 Derive and explain coefficient of regression. Derive formulae for b_{yx} and b_{xy} .
- Q. 7 Mention and prove properties of regression coefficient.
- Q. 8 Explain regression analysis and mention the components involved in regression model.
- Q. 9 What are the uses of regression analysis ?
- Q. 10 What is linear regression and establish properties of least square line (L.S.L) ?
- Q. 11 What is linear weighted least squares approximation.

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► 4.4 IMPORTANT QUESTIONS FOR EXAM

- Q. 1 Explain : (1) Multiple Regression, and (ii) Linear Multiple regression in K-independent Variables.
- Q. 2 Explain Yule's notation with example and partial regression coefficients and the error of estimate.
- Q. 3 Explain order of Regression coefficients.
- Q. 4 Define and find the equations of planes of regression of three variables X_1, X_2, X_3 .
- Q. 5 Interpret partial Regression coefficients.
- Q. 6 Find the expression for variance of residual.
- Q. 7 Define and derive coefficient of multiple regression and show that $R_{1.23}^2 = 1 - \left(\frac{\sigma_{1.23}^2}{\sigma_1^2} \right)$.
- Q. 8 Derive the relation between multiple correlation coefficient and Variance of Residual.
- Q. 9 Explain Test for significance of Multiple correlation coefficient.
- Q. 10 Establish functional relation of partial coefficient $r_{12.3}$.
- Q. 11 Establish relation between Partial Regression coefficient and partial correlation coefficient.
Also relation between Total, Multiple and Partial correlation Coefficients.
- Q. 12 Method of applying t-test for individual Regression coefficients.

► 5.5 IMPORTANT QUESTIONS FOR EXAM

This example shows that M.L.E. for a parameter need not be unique.

- Q. 1 Mention advantages and features of SRS.
- Q. 2 Explain method of Drawing a Random sample.
- Q. 3 What are Merits and Demerits of Simple Random Sampling ?
- Q. 4 Explain the method of stratified Random sampling.
- Q. 5 Explain allocation of sample size in stratified sampling.
- Q. 6 What are merits and demerits of stratified Random sampling ?
- Q. 7 Explain (i) Cluster sampling and (ii) Multistage sampling.
- Q. 8 What are merits and demerits of multistage sampling ?
- Q. 9 Explain Parametric point estimation.
- Q. 10 Mention characteristics of Estimators.
- Q. 11 Explain and give mathematical expression for : (i) Unbiasedness. (ii) Consistency, (iii) efficiency, (iv) Sufficiency,
- Also give short notes for :
 - (i) Mean-squared error
 - (ii) BAN estimators
 - (iii) Completeness
 - (iv) Admissibility
- Q. 13 State and explain factorization theorem.
- Q. 14 Explain 'Working method of moments'.
- Q. 15 Explain the 'method of maximum likelihood estimation'.

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the value of the parameters.

6.9.4 Most Powerful Test (MP)

It is a test, say δ if $H_0 : \theta = \theta_0$ versus $H_1 : \theta = \theta_1$ if size α is MP, if it has the greatest power $\pi(\theta_1 | \delta)$ among all tests of size α or less.

Here π is the power function. And δ has the greatest capacity of detecting H_1 among all tests of size at most α and these specific hypothesis.

6.9.5 Uniformly Most Powerful Test (UMP)

A test δ of $H_0 : \theta \in \Theta_0$ versus

$H_1 : \theta \in \Theta - \Theta_0$, size α is UMP if it has the greatest power.

$\pi_{\theta \in \Theta_1}(\theta | \delta)$ among all tests of size α or less.

"Uniformly" refers to all values of θ . We note the difference in the two statements with respect to the hypothesis and power.

A non-UMP test can be most powerful just for a specific value of θ .

A UMP test is the 'most powerful' test for each value of θ in H_1 .

Level MP-test obeys the likelihood ratio inequalities. Note that the most powerful test may not always be unique as can be deduced from the lemma.

In fact, it may not exist at all.

A Uniformly most powerful Test is always unbiased, if it exists.

Unbiasedness is the property that the probability of rejection is greater under an alternative distribution than it is under null distribution.

6.10 IMPORTANT QUESTIONS FOR EXAM

- Q.1 Compare and explain Null and Alternate Hypotheses.
- Q.2 Explain : (i) Test of Significance (ii) Level of significance (iii) Simple Hypothesis
(iv) Composite Hypothesis.
- Q.3 What is critical region (C.R.) ? Explain.

- Q.4 Explain with diagram one Tailed Test (O.T.T.) and Two Tailed Test (T.T.T.) and Mention their properties.
- Q.5 Explain : Method for Test of Hypothesis.
- Q.6 Explain population and sample..
- Q.7 What is p-value. Describe in detail.
- Q.8 Elaborate Test of Hypothesis concerning single population mean μ , with known variance σ^2 , for large sample. Explain with diagram.
- Q.9 Mention difference between standard deviation and variance.
- Q.10 What is degree of freedom ? Explain with formulae student's t-distribution and its properties.
- Q.11 Explain student's t-test for $(n - 2)$ d.f.
- Q.12 Define F-statistic and develop the formula for $P(F)$.
- Q.13 What are the features and applications of F-distribution.
- Q.14 Explain T-test for Difference of Mean and mention the assumptions, for Difference of Means Test.
- Q.15 Explain Neyman-Pearson Lemma and proposition of Neyman-Pearson Lemma.
- Q.16 What is likelihood Ratio – Test, and interpret it.
- Q.17 Explain in detail MP and UMP-test.

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