

**THIRD SEMESTER UG HONOURS EXAMINATION, NOVEMBER 2023****B.Com. HONOURS****GBCH3B14T: BUSINESS STATISTICS****Time: 3 Hours****Maximum Marks: 80****PART A. Answer *all* the questions. Each carries *one* mark.****Choose the correct answer.**

1. What type of distribution organizes data into classes or intervals with corresponding frequencies.  
A) Chronological                      B) Geometric                      C) Frequency                      D) Categorical
2. Which measure of central tendency represents the middle value in a data set when the data is sorted in ascending order?  
A) Arithmetic Mean                      B) Median                      C) Mode                      D) Geometric Mean
3. Which statistical method quantifies the strength and direction of the relationship between two variables?  
A) Descriptive statistics                      B) Inferential statistics                      C) Correlation                      D) Regression
4. What are the numerical characteristics of a population called?  
A) Variables                      B) Estimators                      C) Parameters                      D) Statisticians
5. What is the term for the error that occurs when a null hypothesis is incorrectly rejected when it is, in fact, true?  
A) Type I error                      B) Type II error                      C) Significance error                      D) Sampling error

**Fill in the Blanks.**

6. Statistics involves the systematic gathering and processing of \_\_\_\_\_ to make informed decisions.
7. The arithmetic mean, median and mode are measures of \_\_\_\_\_.
8. The coefficient of determination, also called R-squared, explains the proportion of variance in the dependent variable explained by the \_\_\_\_\_ variable(s).
9. The process of selecting a subset of individuals or items from a larger population for the purpose of making inferences about the population is known as \_\_\_\_\_.
10. The Chi-square test is a commonly used non-parametric test for assessing the \_\_\_\_\_ between observed and expected frequencies in categorical data.

**(10 x 1 = 10 Marks)****(PTO)**

**PART B: Answer any *eight* questions. Each carries *two* marks.**

11. Define statistics briefly.
12. Name two limitations of statistics as a tool for analysis.
13. Explain the difference between diagrammatic and graphical methods of data presentation.
14. Define skewness and kurtosis.
15. Briefly explain the Lorenz curve and its significance.
16. What is the key difference between a census and a sample survey?
17. Explain the term "standard error" in sampling theory.
18. Differentiate between a null hypothesis and an alternative hypothesis.
19. What does ANOVA stand for, and how does it differ from t-tests in hypothesis testing?
20. Define the term "p-value" in the context of hypothesis testing.

**(8 x 2 = 16 Marks)**

**PART C: Answer any *six* questions. Each carries *four* marks.**

21. Differentiate between statistical inquiries and non-statistical inquiries.
22. Compare and contrast diagrammatic and graphical methods for data presentation.
23. Define frequency distribution and discuss its importance in statistics.
24. Differentiate between linear regression and nonlinear regression.
25. What are the desirable properties of a good estimator? Write an example for each.
26. Describe the process of determining the sample size in a research study. What factors should be considered when deciding on an appropriate sample size?
27. Explain the difference between the independent sample t-test and paired sample t-test.
28. Suppose you are conducting a hypothesis test to determine if a new drug reduces blood pressure. The average systolic blood pressure in a control group is 130 mmHg, and you have a sample of 25 individuals who took the new drug with an average systolic blood pressure of 120 mmHg. The population standard deviation is 10 mmHg. assuming a significance level (alpha) of 0.05.

**(6 x 4 = 24 Marks)**

**PART D: Answer any *two* questions. Each carries *fifteen* marks.**

29. A) Discuss the advantages and disadvantages of using the arithmetic mean as a measure of central tendency.  
B) Explain the concept of index numbers and their role in tracking changes in economic variables.

30. Suppose you have a dataset of the number of hours students spend studying (independent variable, X) and their corresponding scores on an exam (dependent variable, Y). You want to find the linear regression equation to predict exam scores based on study hours.

The data points for five students are as follows:

Student 1: 3 hours of study, score 65

Student 2: 5 hours of study, score 75

Student 3: 7 hours of study, score 85

Student 4: 9 hours of study, score 95

Student 5: 11 hours of study, score 105

Calculate the linear regression equation to predict exam scores based on the number of hours students study.

31. A) Define Chi-Square test. How can the chi-square test be used in market research to analyze customer preferences and product choices?

B) A survey was conducted to determine whether there is an association between gender (male or female) and a preference for a specific type of music genre (rock, pop, or hip-hop). The results of the survey are as follows:

100 males surveyed: 30 prefer rock, 40 prefer pop, and 30 prefer hip-hop.

80 females surveyed: 20 prefer rock, 40 prefer pop, and 20 prefer hip-hop.

Is there a significant association between gender and music genre preference at a significance level (alpha) of 0.05? Conduct a chi-square test to determine the relationship.

**(2 x 15 = 30 Marks)**