



**MBA Pharmaceutical Management**  
**Batch-16<sup>th</sup> (2024-2026)**

**First Year, Term 1, End Term Examinations, December 2024**

**CC – 631 Statistics for Managers**

**Time - 3 Hour**

**Maximum Marks: 50 (Minimum Marks: 20)**

**Instructions to students:**

- This question paper contains 2 printed pages.
- Don't write anything on the Question Paper except your Enrolment No.

**Part A**

**(Maximum Marks: 5)**

**Q1. Choose the correct option/Fill in the blank, as applicable for the following (1 mark each):**

- (a). Time is an example of data with
- (i) Nominal Scale
  - (ii) Ordinal Scale
  - (iii) Interval Scale
  - (iv) Ratio Scale
- (b). The measure of central tendency that is most affected by extreme values is the \_\_\_\_\_.
- (c). A histogram is used to display the relationship between two variables.
- (i) True
  - (ii) False
- (d). What is standard deviation of the data set: 10, 10, 10, 10, and 10
- (i) 0
  - (ii) 1
  - (iii) 1.5
  - (iv) d. 0.75
- (e). Which statistical test is used to check the independence between two categorical variables?
- (i) Correlation
  - (ii) Regression
  - (iii) Covariance
  - (iv) Chi square test

**Part B**

**(Maximum Marks: 15)**

**Answer the following questions (5 mark each).**

- Q2.** Define confidence interval and explain its importance in statistics.
- Q3.** Describe about Types of error in Inferential Statistics
- Q4.** A pharmaceutical company collects the following data during a market research study for a new pediatric syrup formulation:
- Age of pediatric patients (in years).
  - Preference for flavor (e.g., Strawberry, Orange, Mango).
  - Monthly sales of the syrup across five cities (in units).

- Effectiveness rating of the syrup (scale of 1–5, where 1 = Poor and 5 = Excellent).
- Gender of the pediatric patients (Male/Female).

Identify the type of data (nominal, ordinal, interval, or ratio) for each of the five variables above. Suggest the most suitable graphical representation for each variable (e.g., bar chart, histogram, pie chart, line graph).

Justify your choice of graphical representation for two variables:

- Preference for flavor
- Monthly sales of the syrup

### Part C

(Maximum Marks: 30)

Answer the following questions in detail (10 mark each).

- Q5.** The drug effectiveness response times (in minutes) of 10 patients to a new drug are recorded as: 5, 7, 8, 6, 5, 9, 10, 6, 7, 8.
- Calculate the mean, mode, median, range, variance, and standard deviation for the data.
  - Interpret the standard deviation in the context of patient response variability.
  - Discuss the importance of understanding variability in pharmaceutical management.
- Q6.** A pharmaceutical company is planning a study to assess the perceptions of Key Opinion Leaders (KOLs) about a new taste enhancement in a pediatric medicine formulation. KOLs represent 10% of the total population of pediatric doctors in Rajgarh, where the total number of pediatric doctors is 300. The study requires a 95% confidence level, a margin of error of  $\pm 5\%$ , and an assumed response variability of 50% ( $Z$  value = 1.96).
- Calculate the total number of KOLs in the population.
  - Determine the required sample size for an infinite population using the sample size proportion formula.
- Q7.** A pharmaceutical company conducted a study to evaluate the monthly sales performance of three different pediatric drug formulations (Formulation A, Formulation B, and Formulation C) across five cities. The sales data (in units) for one quarter is as follows:

| City   | Formulation A | Formulation B | Formulation C |
|--------|---------------|---------------|---------------|
| City 1 | 500           | 600           | 450           |
| City 2 | 550           | 580           | 470           |
| City 3 | 520           | 610           | 480           |
| City 4 | 540           | 590           | 460           |
| City 5 | 530           | 600           | 490           |

- Calculate the total sales and average sales for each formulation across the five cities.
- Identify which formulation performed the best and justify your answer with calculated data.
- Recommend a suitable graphical representation for the sales data and explain why it is appropriate.
- Discuss the importance of analyzing sales data in pharmaceutical management and how it helps in decision-making.