PAPER ID-311935

Roll No: | | | | | | | | | | | | | |

**MBA**
**(SEM I) THEORY EXAMINATION 2024-25**
**BUSINESS STATISTICS AND ANALYTICS**

**TIME: 3 HRS** **M.MARKS: 100**

**Note:** Attempt all Sections. In case of any missing data; choose suitably.

## SECTION A

**1. Attempt *all* questions in brief.** **2 x 10 = 20**

| Q no. | Question | CO | Level |
|---|---|---|---|
| a. | What is the difference between the range and the interquartile range (IQR)? | 1 | K1 |
| b. | What is skewness, and how does it affect the shape of a distribution? | 1 | K2 |
| c. | How are Index Numbers useful in Business Decision-Making? | 2 | K1 |
| d. | What is Trend Analysis in time series? | 2 | K2 |
| e. | What are the Properties of Correlation? | 3 | K1 |
| f. | Explain Fitting of a Regression Line. | 3 | K2 |
| g. | State the Multiplication Law of Probability. | 4 | K1 |
| h. | What is a Normal Distribution? | 4 | K2 |
| i. | What is Type I Error and Type II Error in hypothesis testing? | 5 | K1 |
| j. | How is a spreadsheet used in Business Analytics? | 5 | K2 |

## SECTION B

**2. Attempt any *three* of the following:** **10 x 3 = 30**

| | | | |
|---|---|---|---|
| a. | Explain the measures of central tendency and dispersion with their importance and provide examples for each. | 1 | K3 |
| b. | Explain the concept of Time Series Analysis and its components. Discuss the Additive and Multiplicative models of Time Series. | 2 | K3 |
| c. | Given the following data of two variables X and Y, calculate the following:<br>Karl Pearson's Coefficient of Correlation (r).<br>The regression line of X on Y.<br>X 10 12 14 16 18<br>Y 20 24 26 28 30 | 3 | K4 |
| d. | State and explain Bayes' Theorem. Discuss its applications. | 4 | K3 |
| e. | Describe the application and purpose of the t-test, Z-test, and Chi-square test in hypothesis testing. | 5 | K5 |

## SECTION C

**3. Attempt any *one* part of the following:** **10 x 1 = 10**

| | | | |
|---|---|---|---|
| a. | You are a data analyst at a company and have collected data on the number of sales made by the sales team over the past month. The data is as follows:<br>Sales Data (in units): 120, 150, 130, 140, 160, 170, 180, 190, 200, 220<br>Calculate the measures of central tendency (mean, median, and mode) for this data set.<br>Interpret the results of these calculations in the context of the company's sales performance. | 1 | K4 |
| b. | "A company has been tracking the monthly sales figures for its products over the past year. The management wants to understand the overall sales performance of the company. Explain how measures of central | 1 | K4 |

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| | | | |
|---|---|---|---|
| | tendency (mean, median, and mode) and measures of dispersion (range, variance, and standard deviation) can be used to assess the sales performance. Discuss how these measures can guide business decisions." | | |

**4. Attempt any *one* part of the following:** **10 x 1 = 10**

| | | | |
|---|---|---|---|
| a. | Elaborate on the uses of Index Numbers, including their types and methods of construction." | 2 | K3 |
| b. | A company produces three products: A, B, and C. The prices and quantities of these products in the base year and the current year are as follows:<br><br>**Product** / **Base Year Quantity** / **Base Year Price** / **Current Year Quantity** / **Current Year Price**<br>A / 10 / 20 / 12 / 24<br>B / 8 / 25 / 6 / 30<br>C / 15 / 10 / 18 / 12<br><br>Calculate the **Fisher Index Number** for the current year. | 2 | K4 |

**5. Attempt any *one* part of the following:** **10 x 1 = 10**

| | | | |
|---|---|---|---|
| a. | Discuss the relationship between Regression and Correlation. Explain their differences. | 3 | K4 |
| b. | Explain the concept of Correlation. Discuss the methods of calculating correlation. | 3 | K4 |

**6. Attempt any *one* part of the following:** **10 x 1 = 10**

| | | | |
|---|---|---|---|
| a. | A factory produces 10% defective items. If 7 items are selected randomly, find the probability that exactly 2 items are defective. | 4 | K4 |
| b. | The heights of a group of students are normally distributed with a mean of 160 cm and a standard deviation of 10 cm. If a student is selected at random, find the probability that:<br>1. The height of the student is less than 150 cm.<br>2. The height of the student is between 150 cm and 170 cm.<br>3. The height of the student is more than 175 cm. | 4 | K4 |

**7. Attempt any *one* part of the following:** **10 x 1 = 10**

| | | | |
|---|---|---|---|
| a. | A retail company wants to improve its overall business performance through effective use of **Business Analytics**. The company plans to analyze customer behavior, sales performance, and the effectiveness of marketing strategies. How can the company use **descriptive statistics** (like averages, trends, and distributions) to evaluate past sales and marketing efforts? Provide an example of how **Predictive Analytics** might assist the company in setting future marketing budgets. | 5 | K7 |

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| | | | |
|---|---|---|---|
| b. | A market researcher wants to test if there is a relationship between gender and preference for a brand of soda. The data collected is as follows:<br><br>**Brand A** / **Brand B** / **Total**<br>Male: 30 / 20 / 50<br>Female: 25 / 25 / 50<br>Total: 55 / 45 / 100<br><br>At a 5% significance level, test whether gender is independent of brand preference.<br>(*From the Chi-square distribution table, the critical value for df=1 at the 5% significance level is **3.841**)* | 5 | K6 |