**Decision Science**

**December 2024 Examination**

**1. Assuming a 4-yearly cycle, find the trend values for the following data by the method of moving average. (10 Marks)**

|  |  |
| --- | --- |
| **Year** | **Sales** |
| **1987** | **74** |
| **1988** | **100** |
| **1989** | **97** |
| **1990** | **87** |
| **1991** | **90** |
| **1992** | **115** |
| **1993** | **126** |
| **1994** | **108** |
| **1995** | **100** |
| **1996** | **125** |
| **1997** | **118** |
| **1998** | **113** |
| **1999** | **122** |
| **2000** | **126** |

**Ans 1.**

**Introduction**

The **4-year moving average** method is a widely used statistical tool that helps identify long-term trends in time-series data by smoothing out short-term fluctuations. It is particularly useful in fields such as economics, business, and finance, where irregular variations or seasonal patterns in data can obscure meaningful insights. By calculating the average of a set period, typically four years in this case, the method helps analysts and decision-makers focus on the underlying trend rather than transient peaks and troughs. This technique is often applied to data such as sales figures, stock prices, and production levels. The goal is to eliminate the "noise" in the data to identify patterns that are more representative of long-term developments, facilitating better forecasting and strategic

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**2. Find the co efficient of correlation between price and sales from the following data. (10 Marks)**

|  |  |
| --- | --- |
| **Price(Rs)** | **Sales(units)** |
| **103** | **500** |
| **98** | **610** |
| **85** | **700** |
| **92** | **630** |
| **90** | **670** |
| **84** | **800** |
| **88** | **800** |
| **90** | **750** |
| **93** | **700** |
| **95** | **680** |

**Ans 2.**

**Introduction**

The coefficient of correlation is a statistical measure that quantifies the degree to which two variables are related. It is widely used in fields such as economics, business, and social sciences to analyze the relationship between variables. In this context, we are examining the correlation between price and sales, two critical variables for businesses. The Pearson correlation coefficient, which ranges between -1 and 1, measures the linear relationship between two variables. A value close to 1 suggests a strong positive correlation, where both variables move in the same direction. A value near -1 indicates a strong negative correlation, where one variable increases as the other decreases

**3a. From the following frequency distribution, find out mean wages of the workers (5 Marks)**

|  |  |
| --- | --- |
| **Wages** | **Number of Workers** |
| **70-80** | **12** |
| **80-90** | **18** |
| **90-100** | **35** |
| **100-110** | **42** |
| **110-120** | **50** |
| **120-130** | **45** |
| **130-140** | **20** |
| **140-150** | **8** |

**Ans 3a.**

**Introduction**

In statistics, the mean is one of the most commonly used measures of central tendency, which represents the average value of a dataset. In the case of grouped data, such as the distribution of wages among workers, the mean can be calculated by using the midpoints of each class and multiplying them by the corresponding frequencies. This allows us to understand the average wage of workers in different wage categories. By calculating the mean, businesses or policymakers can gain insights into the overall wage structure, which is essential for decision-making regarding wage policies

**b. Calculate standard Deviation from the following (5 Marks)**

|  |  |
| --- | --- |
| **Age (in years)** | **Number of Persons** |
| **10-20** | **2** |
| **20-30** | **4** |
| **30-40** | **8** |
| **40-50** | **10** |
| **50-60** | **12** |
| **60-70** | **4** |

**Ans 3b.**

**Introduction**

In statistics, the **standard deviation (SD)** is a measure of the amount of variation or dispersion in a set of data values. A low standard deviation indicates that the data points tend to be close to the mean, while a high standard deviation indicates a wide spread of values around the mean. Calculating the standard deviation for grouped data involves finding the midpoints of each class, computing the deviations from the mean, and then calculating the squared deviations. This value