**Decision Science**

**Jun 2025 Examination**

**1. Calculate Fisher Ideal Index number (10 Marks)**

| **Commodities** | **Base Year Price (P₀)** | **Base Year Expenditure (E₀)** | **Current Year Price (P₁)** | **Current Year Expenditure (E₁)** |
| --- | --- | --- | --- | --- |
| **A** | **2** | **40** | **5** | **75** |
| **B** | **4** | **16** | **8** | **40** |
| **C** | **1** | **10** | **2** | **24** |
| **D** | **5** | **25** | **10** | **60** |

**Ans 1.**

**Introduction**

The Fisher’s Ideal Index Number is a vital statistical tool in the field of economics and decision science, used to measure price level changes over time. It combines the strengths of both Laspeyres and Paasche indices, making it one of the most reliable and accurate methods for price comparison. By taking the geometric mean of these two indices, Fisher’s method balances the advantages and limitations of both, thereby providing a more representative index. This index is particularly helpful for policy analysts, economists, and business planners to understand inflationary trends and cost dynamics. In this question, the index is calculated by considering both the base year and current year prices and expenditures for commodities,

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**Q2 A bag contains 5 white and 3 black balls , 4 balls are successively drawn out and are not replaced. What is the chance that they are taken alternatively of different colours (10 Marks)**

**Ans 2.**

**Introduction**

Probability is a fundamental concept in mathematics and statistics that deals with the likelihood of the occurrence of specific outcomes. In problems involving random draws, especially without replacement, the calculations become more complex due to the changing sample space. This problem considers a bag containing five white balls and three black balls, from which four balls are drawn successively without replacement. The task is to calculate the probability that these balls are drawn alternately in terms of color. That means the order should either be white, black, white, black or black, white, black, white. Since each ball drawn affects the probability of the subsequent draw, we must carefully account for all possible favorable arrangements

**Q3 (A).**

|  |  |
| --- | --- |
| **Marks** | **No. of Students** |
| **0 – 10** | **10** |
| **10 – 20** | **15** |
| **20 – 30** | **x** |
| **30 – 40** | **30** |
| **40 – 50** | **10** |
| **50 – 60** | **10** |

**Find the missing frequency if N is 100 and median is 30**

**Ans 3a.**

In statistics, a median is a measure of central tendency that divides a dataset into two equal parts. It is especially useful for grouped data where individual values are not known. In this case, we are given a frequency distribution with a missing value, and the median is provided. By applying the median formula using class intervals and cumulative frequencies, we can determine the unknown frequency. This method is a practical tool to estimate missing data and

**Q3 (B)**

|  |
| --- |
| **Wages (Rs)** |
| **40** |
| **44** |
| **54** |
| **60** |
| **62** |
| **64** |
| **70** |
| **80** |
| **90** |
| **96** |

**Calculate Standard deviation**

**Ans 3b.**

**Introduction**

Standard deviation is one of the most important measures of dispersion in statistics. It indicates how much the values in a dataset deviate from the mean value. A smaller standard deviation suggests that the data points are closer to the mean, whereas a larger standard deviation indicates more spread. In this question, a set of ungrouped wage data is provided. By using the actual mean method, we aim to find how the wages vary around the average value in this