**Decision Science**

**December 2023 Examination**

**Q1. Draw the decision tree diagram and explain the best possible decision based on EMVs**

**(expected Monetary Values) On the 1st April 2023, Rajinder Saproo, an investor is in a dilemma for the investment of 10 lakh INR. He has consulted his Mumbai based friend, MukulBhai Gadhecha, an investment expert for this matter. Mr Saproo went to meet him at his office located at Prabhadevi. Mukulbhai asked him to express his feeling for the market situation in coming economic year.**

**Mr Saproo assumed the economic growth for the coming year in the following way.**

**10 % optimist for the ‘Good Economic Growth’**

**50 % optimist for the ‘Moderate Economic Growth’**

**40 % optimist for the ‘Lower Economic Growth’.**

**In addition to this, MuKulbhai Gadhecha carried out his analysis to derive possible payoff values considering the various investment options as per the economic situations (presented in the table given below). Figures are in INR on the investment of whole amount of 10 lakhs.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Options** | **Good Economic**  **Growth** | **Moderate Economic**  **Growth** | **Lower Economic**  **Growth’** |
| **Mauti Suzuki Shares** | **3,00,000** | **1,20,000** | **50,000** |
| **TATA Motor Shares** | **4,00,000** | **1,00,000** | **10,000** |
| **D Mart shares** | **4,50,000** | **2,30,000** | **30,000** |

**If you were in place of Mukulbhai Gadhecha, What do you recommend to Mr. Saproo?**

**Note: You are not allowed to use any software for the calculation. But for the preparation of**

**Decision tree diagram you are advised to use Software like MS -Word, PowerPoint etc.**

**(10 Marks)**

**Solution Q. 1**

**Title: Investment Recommendation for Mr. Saproo Using Expected Monetary Values (EMVs)**

**Introduction:**

Mr. Rajinder Saproo, an investor with 10 lakh INR, sought the know-how of MukulbhaiGadhecha, an investment expert based in Mumbai. Mukulbhai became tasked with advising Mr. Saproo on the optimal investment choice given sure economic growth scenarios. Mr. Saproo's notion of the financial landscape for the upcoming year became divided into three procedures: 10% optimistic about 'true economic growth,' 50% confident about 'moderate economic increase,' and 40% happy about 'lower financial increase.' Mukulbhai Gadhecha comprehensively analyzed potential payoffs for diverse investment alternatives underneath these situations. The investment alternatives under attention had been Maruti

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**Q2. Draw the appropriate chart using MS EXCEL, also carryout Exponential Smoothing model in MS EXCEL for the given Alpha values, copy the results (from EXCEL to Word) and explain which alpha is relatively better for the forecast. In this journey of identification of relatively better way of forecasting you may take the support of MAD and MSE type of errors. Suggested Alpha values are 0.1, 0.2, 0.5, 0.7, 0.9. (10 Marks)**

|  |  |
| --- | --- |
|  | **Yield of**  **Groundnut**  **(Kg./hectare)** |
| **2000-01** | **977** |
| **2001-02**  **2002-03**  **2003-04**  **2004-05**  **2005-06**  **2006-07**  **2007-08**  **2008-09**  **2009-10**  **2010-11**  **2011-12**  **2012-13**  **2013-14**  **2014-15**  **2015-16**  **2016-17**  **2017-18**  **2018-19**  **2019-20**  **2020-21**  **2021-22** | **1127** |
| **694** |
| **1357** |
| **1020** |
| **1187** |
| **866** |
| **1459** |
| **1163** |
| **991** |
| **1411** |
| **1323** |
| **995** |
| **1764** |
| **1552** |
| **1465** |
| **1398** |
| **1893** |
| **1422** |
| **2063** |
| **1703** |
| **1758** |

**Data Source: RBI**

**SOLUTION**

**The Quest for the Optimal Alpha:**

Inside the realm of forecasting, we embark on a quest to unveil the alpha value that holds the key to superior predictive powers. Our journey takes us through the dense forest of mean Absolute Deviation (MAD) and the treacherous terrain of suggest-squared mistakes (MSE). These metrics will be our guiding stars in this odyssey.

**The Contestants:**

Our noble contestants are alpha values—0.1, 0.2, 0.5, 0.7, and 0.9. each Alpha seeks to prove its worth in the forecasting world, but only one shall emerge victorious.

**Q3. A) You are not advised to use Software in this case, show the calculation-steps typed in your MS-word file.**

**In Roshni lights ( manufacturer of Mirchi lights) A production run of 2000 set of Mirchi lights being tested for the life, the data shows that life is normally distributed with an average life span of 90 days and a standard deviation of 10 days. What is the probability if a set of Mirchi lights randomly selected from that lot, survived up to 100 days? (5 Marks)**

**SOLUTION 3-A**

To ascertain the chance of a randomly selected set of Mirchi lights from the production lot surviving for 100 days, we delve into the world of records and regular distribution. With a median life span (mean) of 90 days and a standard deviation of 10 days, we embark on a journey to calculate this probability of the usage of the fascinating world of Z-scores and the

**Q3 B) Draw an appropriate chart to show the contribution of each category (in percent form) of Micro, small and medium Enterprises (MSMEs) at the state level. (You may use the MS EXCEL). In conclusion also write, why you have chosen this graph for this problem? (5 Marks)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **StateName** | **DistrictName** | **Total**  **MSMEs** | **Micro** | **Small** | **Medium** |
| **UTTARAKHAND** | **ALMORA** | **1235** | **1068** | **150** | **17** |
| **UTTARAKHAND** | **BAGESHWAR** | **838** | **807** | **29** | **2** |
| **UTTARAKHAND** | **CHAMOLI** | **739** | **688** | **49** | **2** |
| **UTTARAKHAND** | **CHAMPAWAT** | **802** | **745** | **55** | **2** |
| **UTTARAKHAND** | **DEHRADUN** | **12605** | **10600** | **1909** | **96** |
| **UTTARAKHAND** | **HARIDWAR** | **8883** | **6416** | **2263** | **204** |
| **UTTARAKHAND** | **NAINITAL** | **3752** | **3003** | **675** | **74** |
| **UTTARAKHAND** | **PAURI GARHWAL** | **4955** | **4678** | **264** | **13** |
| **UTTARAKHAND** | **PITHORAGARH** | **1061** | **962** | **95** | **4** |
| **UTTARAKHAND** | **RUDRA PRAYAG** | **740** | **698** | **37** | **5** |
| **UTTARAKHAND** | **TEHRI GARHWAL** | **1399** | **1227** | **162** | **10** |
| **UTTARAKHAND** | **UDHAM SINGH NAGAR** | **9746** | **7767** | **1839** | **140** |
| **UTTARAKHAND** | **UTTARKASHI** | **1114** | **1002** | **111** | **1** |

**Data source: OGD**

**SOLUTION 3-B**

**Reasons for Choosing a Stacked Bar Chart:**

**Comparative Clarity:** The number one objective is to offer a clear, visible assessment of the contributions made by Micro, Small, and Medium enterprises to the overall range of MSMEs in each district of Uttarakhand. A stacked bar chart excels on this, presenting those contributions facet through side within each section. This visible contrast is crucial for