**NMIMS Global Access**

**School for Continuing Education (NGA-SCE)**

**Course: Business Statistics for Decision Making**

**Internal Assignment Applicable for April 2024 Examination**

**Q1. Calculate the line of regression model. (Show the calculation step-by-step)**

|  |  |  |
| --- | --- | --- |
|  **Month**  | **Sales**  | **Amount spending in social media Promotion**  |
| **Jan-21**  | **10190**  | **811**  |
| **Feb-21**  | **11149**  | **417**  |
| **Mar-21**  | **11378**  | **445**  |
| **Apr-21**  | **11411**  | **497**  |
| **May-21**  | **11416**  | **567**  |
| **Jun-21**  | **11868**  | **596**  |
| **Jul-21**  | **13487**  | **662**  |
| **Aug-21**  | **13626**  | **672**  |
| **Sep-21**  | **13884**  | **906**  |
| **Oct-21**  | **15269**  | **1123**  |
| **Nov-21**  | **15350**  | **1157**  |
| **Dec-21**  | **16054**  | **1259**  |
| **Jan-22**  | **17791**  | **1416**  |
| **Feb-22**  | **18236**  | **1446**  |
| **Mar-22**  | **18288**  | **1619**  |
| **Apr-22**  | **18578**  | **1620**  |
| **May-22**  | **19003**  | **1635**  |
| **Jun-22**  | **19514**  | **1825**  |

**Write the model with the name of independent and dependent variable that you have chosen.**

**Calculate bo and b1.**

**Write the conclusion with respect to bo and b1**

Ans 1

To calculate the line of regression model, we want to utilize the least squares technique. The line of regression model is given by the situation:

Sales = bo + b1 \* Amount spending in social media Promotion

Here, the independent variable is "Amount spending in social media Promotion" and the dependent variable is "Sales".

Presently, how about we calculate the line of regression model step-by-step:

Step 1: Measure X and Y's mean

It is only half solved

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**Q2. Test the ANOVA using Excel and interpret the findings. Test the hypothesis on average amount of these product categories of export is significant across the years or not. Consider 95 % confidence to comment on this model.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year**  | **Surgical**  | **Ayush**  | **Formulations**  | **Bulk**  |
| **2000**  | **20.17**  | **75.18**  | **687.49**  | **52.28**  |
| **2001**  | **16.71**  | **96.28**  | **795.89**  | **55.43**  |
| **2002**  | **21.11**  | **87.2**  | **1019.87**  | **72.61**  |
| **2003**  | **81.26**  | **113.4**  | **1544.3**  | **182.07**  |
| **2004**  | **83.81**  | **155.02**  | **1927.41**  | **187.87**  |
| **2005**  | **111.3**  | **122.93**  | **2323.72**  | **215.91**  |
| **2006**  | **139**  | **141.14**  | **3007.12**  | **261.7**  |

**Data source: commerce.gov.in, figures are in million USD.**

**Ans 2**

Anova: Single Factor

SUMMARY

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Groups* | *Count* | *Sum* | *Average* | *Variance* |
| Year | 7 | 14021 | 2003 | 4.666667 |
| Surgical | 7 | 473.36 | 67.62286 | 2409.621 |
| Ayush | 7 | 791.15 | 113.0214 | 838.6421 |
| Formulations | 7 | 11305.8 | 1615.114 | 738046 |
| Bulk | 7 | 1027.87 | 146.8386 | 7282.595 |

ANOVA

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 24821748.37 | 4 | 6205437.093 | 41.44796889 | 8.25413E-12 | 2.689627574 |
| Within Groups | 4491489.397 | 30 | 149716.3132 |  |  |  |
| Total | 29313237.77 | 34 |  |  |  |  |

The

**3. AVERAGE PRICE OF GOLD IN DOMESTIC AND FOREIGN MARKETS (source: RBI)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year**  | **Mumbai Rupees per 10gms.**  | **London $ per troy oz.**  | **London Rupees per 10gms.**  |
| **2021-22**  | **47999.25**  | **1818.43**  | **43582.25**  |
| **2020-21**  | **48723.22**  | **1824.08**  | **43541.00**  |
| **2019-20**  | **37017.91**  | **1462.15**  | **33346.53**  |
| **2018-19**  | **31193.41**  | **1263.16**  | **28380.36**  |
| **2017-18**  | **29300.08**  | **1285.28**  | **26618.55**  |
| **2016-17**  | **29665.28**  | **1258.03**  | **27116.42**  |
| **2015-16**  | **26534.26**  | **1147.43**  | **24231.53**  |
| **2014-15**  | **27414.55**  | **1247.40**  | **24520.42**  |
| **2013-14**  | **29190.39**  | **1326.68**  | **25739.35**  |
| **2012-13**  | **30163.93**  | **1653.51**  | **28919.04**  |
| **2011-12**  | **25722.42**  | **1644.87**  | **25394.03**  |
| **2010-11**  | **19227.08**  | **1293.53**  | **18937.48**  |
| **2009-10**  | **15756.09**  | **1023.03**  | **15569.88**  |
| **2008-09**  | **12889.74**  | **867.19**  | **12816.81**  |
| **2007-08**  | **9995.62**  | **765.78**  | **9897.12**  |
| **2006-07**  | **9240.32**  | **628.41**  | **9137.79**  |
| **2005-06**  | **6900.56**  | **476.58**  | **6790.26**  |
| **2004-05**  | **6145.38**  | **413.95**  | **5976.14**  |
| **2003-04**  | **5718.95**  | **377.65**  | **5573.53**  |
| **2002-03**  | **5332.36**  | **325.49**  | **5062.11**  |
| **2001-02**  | **4579.12**  | **277.74**  | **4260.23**  |
| **2000-01**  | **4473.60**  | **272.12**  | **4007.79**  |

**Part A: Prepare an appropriate chart with Forecast (use EXCEL) for the mentioned three columns, write the justification for the chart you have chosen. (5 Marks)**

**Part B: Which time series component present in the above data as far as long-term pattern is concerned?**

Ans 3a

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Mumbai Rupees per 10gms. | London $ per troy oz. | London Rupees per 10gms. |
| 2021-22 | 47999.25 | 1818.43 | 43582.25 |
| 2020-21 | 48723.22 | 1824.08 | 43541 |
| 2019-20 | 37017.91 | 1462.15 | 33346.53 |
| 2018-19 | 31193.41 | 1263.16 | 28380.36 |
| 2017-18 | 29300.08 | 1285.28 | 26618.55 |
| 2016-17 | 29665.28 | 1258.03 | 27116.42 |
| 2015-16 | 26534.26 | 1147.43 | 24231.53 |
| 2014-15 | 27414.55 | 1247.4 | 24520.42 |
| 2013-14 | 29190.39 | 1326.68 | 25739.35 |