**Business Statistics for Decision Making**

**December 2021 Examination**

**Q:1: The following table shows the details for some of the car models.**

**TABLE BELOW**

|  |  |  |
| --- | --- | --- |
| **Car** | **Horsepower** | **MPG** |
| **Chevrolet Chevelle Malibu** | **130.0** | **18.0** |
| **Buick Skylark 320** | **165.0** | **15.0** |
| **Plymouth Satellite** | **150.0** | **18.0** |
| **AMC Rebel SST** | **150.0** | **16.0** |
| **Ford Torino** | **140.0** | **17.0** |
| **Ford Galaxie 500** | **198.0** | **15.0** |
| **Chevrolet Impala** | **220.0** | **14.0** |
| **Plymouth Fury** | **215.0** | **14.0** |
| **Pontiac Catalina** | **225.0** | **14.0** |
| **AMC Ambassador DPL** | **190.0** | **15.0** |
| **Citroen DS-21 Pallas** | **115.0** | **0** |
| **Chevrolet Chevelle Concours** | **165.0** | **0** |
| **Ford Torino** | **153.0** | **0** |
| **Plymouth Satellite** | **175.0** | **0** |
| **AMC Rebel SST** | **175.0** | **0** |
| **Dodge Challenger SE** | **170.0** | **15.0** |
| **Plymouth 'Cuda 340** | **160.0** | **14.0** |
| **Ford Mustang Boss 302** | **140.0** | **0** |
| **Chevrolet Monte Carlo** | **150.0** | **15.0** |
| **Buick Estate Wagon** | **225.0** | **14.0** |
| **Toyota Corolla Mark** | **95.00** | **24.0** |
| **Plymouth Duster** | **95.00** | **22.0** |
| **AMC Hornet** | **97.00** | **18.0** |
| **Ford Maverick** | **85.00** | **21.0** |
| **Datsun PL510** | **88.00** | **27.0** |
| **Volkswagen 1131 Deluxe Sedan** | **46.00** | **26.0** |
| **Peugeot 504** | **87.00** | **25.0** |
| **Audi 100 LS** | **90.00** | **24.0** |

**A. You are required to find out the following for the ‘Horsepower’ and ‘MPG’ column:**

**a. Mean**

**b. Median c. Mode**

**d. Variance**

**e. Standard deviation f. Skewness**

**g. Kurtosis**

**B. Why do we use correlation analysis? What can be the maximum and minimum values for correlation? Identify the correlation between Horsepower and MPG.**

**Instructions - Use MS-Excel to show your output. Write the formulae in the answer that you use. (10 Marks)**

**Ans 1A.**

|  |  |  |
| --- | --- | --- |
|  | **Horsepower** | **MPG** |
| **Mean** | 157.63 | 12.46 |
| **Median** | 156.50 | 15.00 |
| **Mode** | 150.00 | 0.00 |
| **Variance** | 1739.20 | 60.78 |
| **Standard deviation** | 41.70 | 7.80 |
| **Skewness** | -0.03 | -0.78 |
| **Kurtosis** | -0.68 | -0.69 |

The above table shows the summary of the values requested within the question.

 The easy mathematical common of or more numbers is called a mean. Mean is simply the average of the dataset. Arithmetic suggests an approach, which uses the sum of the numbers within the collection. The geometric indicates a method, the standard of a hard and fast of products, is two ways to determine the implications for a given series of numbers. However, Its Half solved only

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**Ans 1B.**

The determination coefficient is far more helpful than the correlation coefficient because the hyperlink between two variables X and Y, is statistically credible. It's far marked through r2, and the correlation coefficient is honestly a square. At the same time, as the correlation coefficient provides the energy of the hyperlink entirely in the form of a cautiously selected adjective, the

**Q2: The following table shows the data of house prices (per unit area) in various parts of a city in India. A real estate agency wants to find out if the house prices depend on various factors like the age of the house, its distance from the nearest metro station and the number of nearby convenience stores. How will you help them in arriving at a conclusion?**

|  |  |  |  |
| --- | --- | --- | --- |
| **House age** | **Distance from nearest**  **metro station** | **No. of nearby**  **convenience stores** | **House price**  **per unit area** |
| **32** | **84.87882** | **10** | **37.9** |
| **19.5** | **306.5947** | **9** | **42.2** |
| **13.3** | **561.9845** | **5** | **47.3** |
| **13.3** | **561.9845** | **5** | **54.8** |
| **5** | **390.5684** | **5** | **43.1** |
| **7.1** | **2175.03** | **3** | **32.1** |
| **34.5** | **623.4731** | **7** | **40.3** |
| **20.3** | **287.6025** | **6** | **46.7** |

|  |  |  |  |
| --- | --- | --- | --- |
| **31.7** | **5512.038** | **1** | **18.8** |
| **17.9** | **1783.18** | **3** | **22.1** |
| **34.8** | **405.2134** | **1** | **41.4** |
| **6.3** | **90.45606** | **9** | **58.1** |
| **13** | **492.2313** | **5** | **39.3** |
| **20.4** | **2469.645** | **4** | **23.8** |
| **13.2** | **1164.838** | **4** | **34.3** |
| **35.7** | **579.2083** | **2** | **50.5** |
| **0** | **292.9978** | **6** | **70.1** |
| **17.7** | **350.8515** | **1** | **37.4** |
| **16.9** | **368.1363** | **8** | **42.3** |
| **1.5** | **23.38284** | **7** | **47.7** |
| **4.5** | **2275.877** | **3** | **29.3** |
| **10.5** | **279.1726** | **7** | **51.6** |
| **14.7** | **1360.139** | **1** | **24.6** |
| **10.1** | **279.1726** | **7** | **47.9** |
| **39.6** | **480.6977** | **4** | **38.8** |

**You are required to do the following:**

**(a) Identify the dependent and the independent variables. (b) Apply multiple regression and show the output.**

**(c) What is the value of R-squared you found?**

**(d) How do you interpret the value of R-squared?**

**(e) Interpret if the overall regression model is significant.**

**(f) Interpret if the impact of each of the independent variables are significant. Instructions: Use MS-Excel to show your output. (10 Marks)**

**A.**

Multiple Regressions is a collection of processes to describe the links between or more significant variables or predictors and one dependant or variable of standards. An established variable is modeled with the corresponding coefficients and consistent situations as a feature of several separate variables. Multiple regressions contain several independent variables and are hence referred to as a couple of regressions. The goal is to give a version describing a based variable and many impartial variables in a couple of regressions.

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**Q.3 Types of correlation. Correlation analysis**

**A behavioral scientist is interested in studying the effect of stress on employee health for an organization. For this he has conducted a survey and have collected data for different parameters like health condition, emotional balance etc. He found out there is a direct correlation between emotional balance and illness among the employees. Based on this answer the following:**

**a. What are the various types of correlation that you know about between two variables? Explain them with diagrams. (5Marks)**

**b. What is the use of Karl Pearson’s coefficient of correlation? Write and explain the**

**formula for the same. (5 Marks)**

**A.**

Comparing two variables' degree of association or dating is called correlation. Correlation coefficients are used to quantify relationships.

One variable (X) will increase, the other (Y) follows suit, and the correlation is positive. There are various superb correlations, from 0 to +1, with +1 being an appropriate advantageous correlation. A proportional increase accompanies each unit increase in a single variable, which is

**B.**

Comparing variables' degree of association or relationship is called correlation. Correlation coefficients are used to quantify relationships. It is important to develop core notions at the correlation and its coefficient in popular earlier than going into info at the Karl Pearson Coefficient of Correlation. The correlation coefficient can be defined as a degree of the