**Business Statistics for Decision Making**

**December 2024 Examination**

**1. The management of Jubilant Hotels Pvt. Ltd. was trying to understand what drives the occupancy of the hotel. They identified City Arrivals per day, advance bookings of the hotel and promotional activities of their major competitor (Stellar Hotels) as variables that drive the occupancy of the hotel. They have collected the following data.**

**Table 1: Data Set**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Period** | **Jubilant**  **Occupancy** | **City Arrivals per Day** | **Jubilant Advance**  **Bookings** | **Stellar Promotions (1- Activity conducted; 0 - Activity not conducted)** |
| **Jan-21** | **308** | **2,622** | **200** | **1** |
| **Feb-21** | **471** | **3,189** | **250** | **0** |
| **Mar-21** | **399** | **3,022** | **250** | **1** |
| **Apr-21** | **373** | **3,003** | **175** | **0** |
| **May-21** | **380** | **2,890** | **185** | **0** |
| **Jun-21** | **373** | **3,080** | **180** | **1** |
| **Jul-21** | **484** | **3,418** | **300** | **1** |
| **Aug-21** | **438** | **3,184** | **250** | **0** |
| **Sep-21** | **399** | **2,702** | **250** | **0** |
| **Oct-21** | **477** | **3,358** | **285** | **0** |
| **Nov-21** | **367** | **2,898** | **200** | **0** |
| **Dec-21** | **276** | **2,538** | **170** | **1** |
| **Jan-22** | **315** | **2,499** | **255** | **1** |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Dec-22** | **295** | **2,640** | **185** | **1** | | **Jan-23** | **328** | **2,490** | **260** | **0** | | **Feb-23** | **393** | **3,093** | **300** | **1** | | **Mar-23** | **419** | **2,948** | **270** | **0** | | **Apr-23** | **367** | **2,695** | **305** | **1** | | **May-23** | **386** | **2,797** | **250** | **1** | | **Jun-23** | **432** | **3,452** | **250** | **0** | | **Jul-23** | **438** | **3,313** | **275** | **1** | | **Aug-23** | **471** | **3,217** | **305** | **0** | | **Sep-23** | **250** | **2,102** | **150** | **1** | | **Oct-23** | **354** | **2,405** | **280** | **1** | | **Nov-23** | **282** | **2,238** | **175** | **0** | | **Dec-23** | **295** | **2,297** | **185** | **1** |   **Feb-22** | **393** | **3,092** | **200** | **0** |
| **Mar-22** | **471** | **3,045** | **300** | **0** |
| **Apr-22** | **419** | **3,019** | **200** | **0** |
| **May-22** | **432** | **2,963** | **240** | **0** |
| **Jun-22** | **438** | **3,312** | **205** | **0** |
| **Jul-22** | **451** | **3,424** | **315** | **1** |
| **Aug-22** | **458** | **3,168** | **265** | **0** |
| **Sep-22** | **406** | **2,852** | **250** | **0** |
| **Oct-22** | **425** | **3,044** | **210** | **1** |
| **Nov-22** | **328** | **2,423** | **260** | **1** |

**On the basis of data given in Table 1, find the correlation of Jubilant occupancy with each of the independent variables and comment on the nature and strength of the relationship. Also, run the multiple regression and interpret the resultant Excel summary output in this context with reference to the following:**

**• Adjusted R-square value**

**• Multiple R**

**• ANOVA**

**(10 Marks)**

**Ans 1.**

**Introduction:**

In the competitive hospitality industry, understanding the factors that drive hotel occupancy is essential for making data-driven decisions. Jubilant Hotels Pvt. Ltd. has identified several variables such as City Arrivals per day, advance bookings, and the promotional activities of a major competitor, Stellar Hotels, as key factors influencing their hotel occupancy. The goal of the management is to quantify the relationship between these factors and occupancy using statistical tools. Specifically, correlation analysis will help evaluate the strength and direction of the relationship between each independent variable and the dependent variable (Jubilant hotel occupancy). Additionally, multiple regression analysis will be conducted to predict occupancy and understand the combined effect of these variables on hotel performance. This report will include interpretations of correlation coefficients, the adjusted R-square, multiple R, and ANOVA from the multiple regression model output, providing insights into the statistical significance

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**2. On the basis of the data given in Table 1:**

* **Compute the measures of central tendency of Jubilant Occupancy, City Arrivals per day, and Jubilant Advance Bookings.**
* **Compute the standard deviations of these 3 variables.**
* **Construct the histogram for each of these three variables, and comment on their skewness.**

**(10 Marks)**

**Ans 2.**

**Introduction**

Understanding the factors that drive hotel occupancy is crucial for effective business decision-making, especially in the hospitality industry. Jubilant Hotels Pvt. Ltd. aims to analyze three key variables—City Arrivals per Day, Jubilant Advance Bookings, and the promotional activities of its competitor Stellar Hotels—to gain insights into their impact on occupancy rates. By applying statistical tools like measures of central tendency (mean, median, and mode), standard deviation, and histograms, we can explore the distribution and variability of these factors. This analysis not only provides a comprehensive view of how these variables interact but also helps in identifying trends and patterns that affect hotel performance. Such insights are

**3. Trusty Automobile Auto Parts & Supplies Ltd. sells a popular brand of engine oil. The firm has been in business for a long period of time. The company policy is to place a reorder with the supplier once the stock level of the engine oil falls to 15 gallons. The Sales Manager is concerned that the company is losing sales as there are frequent instances of stock-outs (no stock available to meet customer demands). The company has observed that the demand during the lead time (the time between placing a reorder with the supplier and receiving the replenishment) is normally distributed with a mean of 12 gallons and a standard deviation of 4 gallons.**

**a. What is the probability of a stock-out? (i.e., demand during lead time exceeding 15 gallons) (5 Marks)**

**Ans 3a.**

**Introduction:**

Trusty Automobile Auto Parts & Supplies Ltd. follows a policy of reordering engine oil when stock levels fall to 15 gallons. However, the company has experienced frequent stock-outs, which impacts sales and customer satisfaction. To assess the probability of a stock-out, it is essential to evaluate the demand during the lead time. Given that the demand follows a normal distribution with a mean of 12 gallons and a standard deviation of 4 gallons, the probability of a stock-out can be calculated using statistical techniques. This analysis will help the company understand

**b. The sales manager would like to reduce the probability of a stock-out to be no more than 3%. What should the reorder point be (i.e., what should be the existing stock level when the company places a reorder)? (5 Marks)**

**Ans 3b.**

**Introduction:**

The sales manager of Trusty Automobile Auto Parts & Supplies Ltd. is concerned about reducing the frequency of stock-outs, which occur when demand during the lead time exceeds the reorder point. The goal is to lower the probability of stock-outs to no more than 3%. This requires adjusting the current reorder point from 15 gallons to a higher level to ensure that the risk of running out of stock during the lead time is minimized. This solution involves determining the optimal