**Tutorial 2**

**Statistical Analysis 1, CBA**

**ISB**

1. Following table contains data on water absorbency of cotton and Acetate fibers (in %). Based on this data, can one conclude that the difference in mean water absorbency of cotton fiber and acetate fiber is statistically significant at 5%? Assume the population variances are equal.

|  |  |  |  |
| --- | --- | --- | --- |
| Fiber | Sample Size, n | Sample mean | Sample Standard deviation |
| Cotton | 28 | 19.93 | 1.51 |
| Acetate | 25 | 12.07 | 1.25 |

1. Twelve cars were equipped with radial tires and driven over a test course. Then the same 12 cars (with the same drivers) were equipped with regular belted tires and driven over the same course. After each run, the cars’ gas economy (in km/l) was measured. Is there evidence that radial tires produce better fuel economy? (Use α= 0.05.)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gas Economy|Cars | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Y1 Radial | 4.2 | 4.7 | 6.6 | 7.0 | 6.7 | 4.5 | 5.7 | 6.0 | 7.4 | 4.9 | 6.1 | 5.2 |
| Y2 Belted | 4.1 | 4.9 | 6.2 | 6.9 | 6.8 | 4.4 | 5.7 | 5.8 | 6.9 | 4.7 | 6.0 | 4.9 |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Machine 1** | **Machine 2** | **Machine 3** |
| **Observations** | 25 | 31 | 24 |
| 30 | 39 | 30 |
| 36 | 38 | 28 |
| 38 | 42 | 25 |
| 31 | 35 | 28 |

1. A manufacturing company has purchased three new machines of different makes and wishes to determine whether one of them is faster than the others in producing a certain output. Five hourly production figures are observed at random from each machine and the results are given in the table below. Determine whether the machines are significantly different in their average speeds. Use 5% level of significance.
2. The following table shows the lives (in hours) of four batches of electric lamps. Perform an Analysis of Variance on this data to test for whether the significance test can reject their homogeneity. Test at 5% level of significance.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Batch #** | **Life of bulbs in hours** | | | | | | | |  |
| **1** | 1600 | 1610 | 1650 | 1680 | 1700 | 1720 | 1800 | 1860 | **1702.5** |
| **2** | 1580 | 1640 | 1640 | 1700 | 1750 | 1820 | 1830 | 1830 | **1723.75** |
| **3** | 1460 | 1550 | 1600 | 1620 | 1640 | 1660 | 1740 | 1820 | **1636.25** |
| **4** | 1510 | 1520 | 1530 | 1570 | 1600 | 1680 | 1700 | 1720 | **1603.75** |
|  |  |  |  |  |  |  |  |  | **1666.5625** |

1. A magazine reported the results of a telephone poll of 800 adult Indians; 600 of them non-smokers. They were asked the following question: ‘Should the tax on Cigarettes be raised by 1.25%, to pay for the healthcare reform?’ There are 200 non-smokers and 50 smokers answered yes to this question. Which of the following is APPROXIMATE strength of the evidence to conclude that smokers and non-smokers are different in their opinion about the tax increase?
   1. 0.03
   2. 0.06
   3. 0.97
   4. 0.94