1. Set up Null and Alternate hypotheses for the following statements.
   1. It is suspected that a coin is biased.
   2. It is suspected that a die is biased.
   3. The school dropout amongst rural girl children is believed to have come down. The previous dropout ratio was 1/3.
   4. An aluminium roof has to be constructed with sheet thickness of 0.05 inch. If the thickness is less the strength of the sheet would be less and may develop cracks. If the thickness is more the sheet will be too heavy for the structure to support it.
   5. A fertilizer manufacturer claims that the new fertilized produced by it gives much higher yield compared to current average yield of 27 quintals per hectare.
   6. It is believed that the proportion of absentee female employees is significantly different from that of males = 19%.
   7. A hotel manager claims that average bill for a day’s stay in his hotel is Rs. 2000 or less.
   8. A sugar factory production line fills bags to 50kg. If a sample periodically chosen and weighed and if the under filling or overfilling is noticed the production is stopped for adjustment.
   9. A new production line is believed to reduce production cost substantially. The current mean cost of production is Rs.14000 per hour.
   10. A smartphone dealer is considering a new bonus plan which is expected to increase sales. The current mean sales volume is 2200 phones a month. The new plan will be tried for 1 month and will be implemented if found effective.
   11. Start-up Investors believe that electricity costs in Chennai is higher compared to Hyderabad. The cost per month for commercial customer in Hyderabad for start-ups is Rs.7800.
   12. A label on an orange juice carton specifies that fat content is 1 gm or less.
   13. An IT company is planning a pay hike to reduce attrition. The current average monthly attrition is 11 per 100. A new compensation scheme will be tried on a pilot basis in one of the departments.
2. A placement manager of a business school came across a newspaper report that average entry salary of an MBA graduate is Rs. 300,000/year with a standard deviation of Rs. 40,000. The manager believes that students from his institute earn more. A random sample of 36 students indicated an average salary of 310,000. Validate the manager’s claim.
3. The marketing manager of a smartphone company is considering launching a new model into the market. He is willing to introduce the model only if the acceptance rate is greater than 30%. Of the random sample of 200 customers, 32% of people surveyed showed interest in the phone. Should the marketing manager proceed with the launch?
4. A leading business school claims that its one-year EDBA course enhances the quantitative aptitude of students significantly. A NASSCOM study reported a mean aptitude score of 350 with a standard deviation of 70. A sample of 36 students who have undergone the EDBA course achieved a mean score of 375. Does the survey support claim of the institute?
5. A company sources the yarn used in garment manufacture from several suppliers. The specification stipulates mean tensile strength of the yarn to be 14 kg. The quality manager suspects that one of the suppliers is supplying inferior quality yarn. A random sample of 100 specimen resulted in a mean tensile strength of 13.5 kg with a standard deviation of 2.5 kg. is the suspicion of the quality manager true at 95% confidence level? Rework the example at 99% confidence level.
6. A sales manager introduced a new incentive scheme for the sales force with a view to improve their sales performance. The new scheme is pilot tested for five months on a randomly selected 20 salespersons. The results of the pilot study is given below. Is the new scheme effective?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SP Id | Sales | | SP Id | Sales | | SP Id | Sales | |
| Current | New | Current | New | Current | New |
| 1 | 60 | 67 | 2 | 123 | 140 | 3 | 62 | 60 |
| 4 | 85 | 88 | 5 | 90 | 90 | 6 | 83 | 95 |
| 7 | 45 | 40 | 8 | 120 | 125 | 9 | 50 | 48 |
| 10 | 90 | 110 | 11 | 75 | 95 | 12 | 70 | 80 |
| 13 | 80 | 100 | 14 | 50 | 60 | 15 | 50 | 45 |
| 16 | 60 | 80 | 17 | 90 | 95 | 18 | 80 | 70 |
| 19 | 85 | 90 | 20 | 75 | 80 |  |  |  |

1. Airline ground staff are expected to inflate the tires to exact pressure for safe operation of the aircraft. The stipulated pressure is 16 psi. A sample of 8 tires were checked for their pressure level yielded the following measurements.

16.02, 16.22, 15.82, 15.92, 16.22, 16.32, 16.12, 15.92, 16.07

Are the ground staff filling tires properly?