Hypotheses Tests

- **Hypothesis**
- **Expected estimate and Sample estimate**
- **Types of Hypotheses**
- **Types of Errors**
- **Type I Error**
- **Type II Error**
- **Acceptance and Rejection Regions (Critical Regions)**
- **Two-Tail and One-Tail tests**
- **What to test**

Exercises

1. It is expected that the average height of a Desktop computer is 64 inches. When a sample size of 100 items is tested the average height is 67 inches with a standard deviation of 2.5 inches. Test the expectation using 95% confidence.

2. An electronic item manufacturer says that the average weight of a computer system is 10kg. A sample size of 50 is selected; the average weight is 9kg with the standard deviation of 1.3kg. Test the statement using 95% confidence.

3. One newspaper says that at least 14 hours of internet per month are used by people in a selected area. A researcher has done a study to examine the usage of internet by the people selecting a sample size of 50. The average usage hours are 13 with a standard deviation of 3.5 hours. Test the statement using 95% confidence.

4. A computer chair producer says that his product can bear 150kg. A sample size of 64 has an average weight of 145kg with standard deviation of 16.8kg. Test the producer's statement at 5% level of significance.

5. It is expected that the maximum voltage used by an electronic device is 110V. When a sample size of 80 is selected, the average used voltage is 115V with a standard deviation of 3V. Test the hypothesis at 5% level of significance.

6. One electric bulb producer says that the burning hours of their product is 500hrs. When a sample size of 100 bulbs is tested, the average burning hours is 495hrs with the standard

7. It is expected that the maximum weight of a product is 20Kg. When a sample size of 25 items is tested average weight is 22kg with the standard deviation of 4Kg. Test the expectation at 5% level of significance.

8. Management of a company says that their productivity is 30. Productivity of ten days is provided below. Test the statement.

20	25	32	28	30	30	25	26	35	34

9. Electronic company says that the weight of their large UPS is 50kg and a researcher selected a sample size of ten items to test this statement. Weight of the sample items is provided by the following table.

50	50.2	49	49.2	48.7	50	49	51	48	51

Test the statement of the electronic company.

10. It is expected that 60% of employees in the company should be male employees. Selecting a sample size of 250 employees, this should be tested at 5% level of significance. 58% of the sample is male employees. Test the expectation.

11. A company produces electronic items. It says that the level of the quality of their product is more than 95%. When a sample size of 100 items is tested, the level of the quality is 92%. Test the company's statement at 5% level of significance.

12. It is expected that the maximum percentage of defective items should not be more than 3%. When a sample size of 20 is tested, one item is defective. Test the expectation at 5% level of significance.

13. Ministry of education says that there is not any difference between the students of schools "A" and "B". When a sample size of 50 from each school is selected, the average mark of students in the "A" school is 80 and in the "B" school is 75. Standard deviations are 10 and 8 marks respectively. Test the statement of Ministry at 95% level of confidence.

14 .If the size of selected samples of the above schools is 10 and 15 respectively, test the statement of the Ministry again.

15. Two companies produce same product by using different process. Their productivities have been provided below. Test whether there is a significant difference between the productivities.

Product 1	50	52	51	49	48	52	47	49	49	50
Product 2	53	47	49	51	47	49	50	48	51	48

16. There are two companies which produce computer monitors in two brands. Management of the both companies says that their brands are equal in weight and no difference between the two brands. Following information is given. Test this statement.

Company 1 (Kg)	2.0	2.1	2.1	1.8	1.8	2.2	1.7	1.9	1.9	2.0
Company 2 (Kg)	2.2	1.7	1.9	2.1	1.7	1.7	2.0	1.8	2.1	1.9

17. A machine producer says that there is not any difference between the quality of machine 1 and machine 2. When a sample size of 100 items produced by machine 1 is tested, the level of quality is 95%. Another sample size of 150 items produced by machine 2 is tested; the level of quality is 93.2%. Test the producer's statement at 95% level of confidence.

18. If the selected sample size from machine 1 is 20 and machine 2 is 15, test the producer's statement again.