

Q-1) Production quantities per hour for two assembly line workers during randomly selected one-hour periods are recorded below:

Worker A : 21 24 25 27 23 24

Worker B : 23 19 20 26 22

Test the significance of the difference between the mean productions of the two workers. Assume that population is normal, their variances are equal and the sample is independent. Use $\alpha = 0.10$. (Hint: Use 't' test for two independent sample)

Q-2)(a) A plant is in control when the Average Quantity of Instant coffee that is packed in a Jar is 6 Ounces. The Standard Deviation of Quantity is 0.2 ounces. A Sample of 100 Jar is selected, at random, and the Average Quantity is found to be 6.1 ounces. Is the process out of control use $\alpha = 0.05$. (Hint: Use Z – test)

(b) Find out 95% construct Interval for True Average Quantity of Coffee, based on the above given information. (Hint use z –test)

Q-3) A physical director claims by taking a special vitamin a weight lifter can increases his strength. Eight athletes are selected and given a test of strength, using the standard bench press. After two weeks of regular training supplemented with the vitamin, they are tested again, test the effectiveness of the vitamin regiment at $\alpha = 0.05$. each value in the data represent the maximum of pounds that athlete can bench press. Assume that the variable is approximately normally distributed. (Hint: Use 't' two dependent sample paired match test)

Athlete	1	2	3	4	5	6	7	8
Before	210	230	182	205	262	253	219	216
After	219	236	179	204	270	250	222	216

Q-4) The president of a company knows that sales in April are historically unstable. In order to investigate the relationship between temperature and sales during this month, measurement over a period of years produced the following results.

Average temperature °C (x)	19	23	25	24	26	21
Sales (10,000 of Rs) (y)	66	74	72	76	78	72

- Find the line of regression of Y on X. (Use a simple linear regression equation)
- Calculate coefficient of correlation 'r'.
- Find the hypothesis that sales independent of temperature, use $\alpha = 0.05$

Q-5) A consumer organization claims that 4 brands of light bulbs have the same mean life in hours. The following table represents random sample of 3 taken from each brand with the life given in hundreds of hours.

Brand of Bulb

A	B	C	D
10	11	13	18
9	16	8	23
5	9	9	25

Perform an **analysis of variance (ANOVA)** test at the 1% level of significance to see if there is any reason to doubt that the mean bulb life is the same for the three brands.

(Note: 'ANOVA' topic lecture will be deliver in the coming next week classes. So you can submit after the classes.)

Useful information:

$$t_{0.05,9} = 1.833, \quad X^2_{0.05,6} = 12.592, \quad t_{0.025,4} = 2.776, \quad t_{0.05,2} = 5.991$$

$$F_{0.01(3,8)} = 7.59$$