



Dr. Vishwanath Karad

**MIT WORLD PEACE
UNIVERSITY** | PUNE

TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

SY B.Tech-CSE

Question Bank

Unit - V

1. A manufacturer intends that his electric bulbs have a life of 1000 hours. He tests a sample of 20 bulbs, drawn at random from a batch and discovers that the mean life of the sample bulbs is 990 hours with S.D. of 22 hours. Does this signify that the batch is not up to the standard?
(**Given:** The table value of t at 1% level of significance with 19 degrees of freedom is 2.539)
Ans: $t = -2.033$
2. Ten individuals are chosen at random from a population and their heights are found to be in inches 63, 63, 64, 65, 66, 69, 69, 70, 70, 71. Discuss the suggestion that the mean height of universe is 65.
(**Given:** for 9 degree of freedom t at 5% level, of significance = 2.262)
Ans: $t = 2.02$
3. The mean life time of sample of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with standard deviation of 120 hours. The company claims that the average life of the bulbs produced by it is 1600 hours. Using the level of significance of 0.05, is the claim acceptable?
(**Given:** At 0.05 the level of significance, $t = 1.96$)
Ans: $t = 2.5$

4. A sample of 6 persons in an office revealed an average daily smoking of 10, 12, 8, 9, 16, 5 cigarettes. The average level of smoking in the whole office has to be estimated at 90% level of confidence.

(**Given:** $t=2.015$ for 5 degree of freedom.)

Ans: $\mu= 6.92, 13.08$

5. A fertiliser mixing machine is set to give 12 kg of nitrate for quintal bag of fertiliser. Ten 100 kg bags are examined. The percentages of nitrate per bag are as follows:

11, 14, 13, 12, 13, 12, 13, 14, 11, 12.

Is there any reason to believe that the machine is defective?

(**Given:** Value of t for 9 degree of freedom is 2.262.)

Ans: $t= 1.4636$

6. A random sample of size 16 values from a normal population showed a mean of 53 and a sum of squares of deviation from the mean equals to 150. Can this sample be regarded as taken from the population having 56 as mean? Obtain 95% and 99% confidence limits of the mean of the population.

$\gamma = 15, \alpha = 0.05, t = 2.131$

$\alpha = 0.01, t = 2.947$

Ans: $t= 3.79$

7. Two independent samples of 8 and 7 items respectively had the following values of the variables (weight in ounces):

Sample 1: 9 11 13 11 15 9 12 14

Sample 2: 10 12 10 14 9 8 10

Is the difference between the means of the sample significant?

(**Given:** for $V= 13, t_{0.05} = 2.16$)

Ans: $t= 1.2$

8. The following data give the number of accidents occurred during the various days of a week.

Days	Mon	Tue	Wed	Thurs	Fri	Sat	Total
No. of accidents	15	19	13	12	16	15	90

Test whether the accidents are uniformly distributed over the week.

(**Given:** $\chi^2_{0.05}(v = 5) = 11.07$)

Ans: $\chi^2 = 2$

9. Among 64 offsprings of a certain cross between pigs 34 were red, 10 were black and 20 were white. According to the genetic model these numbers should be in the ration 9:3:4. Are the data consistent with the model at 5% level.

(**Given:** $\chi^2_{2;0.05} = 5.991$)

Ans: $\chi^2_2 = 1.44$

10. The following data shows the digits in numbers chosen at random from a directory.

Digits	0	1	2	3	4	5	6	7	8	9	Total
Frequency	1026	1107	997	966	1075	933	1107	972	964	853	1000

Test whether the digits may be taken to occur equally frequently in the directory.

(**Given:** $\chi^2_{0.05}$ for 9 d.f.= 16.919)

Ans: $\chi^2 = 58.542$

11. A nationalized bank utilizes four teller windows to render fast service to the customers. On a particular day, 800 customers were observed. They were given service at the different windows as follows:

Window number	1	2	3	4
Expected number of customers	150	250	170	230

Test whether the customers are uniformly distributed over the windows.

(**Given:** $\chi^2_{3;0.05} = 7.815$)

Ans: $\chi^2_3 = 34$

12. The table below gives the number of books issued from a certain library on the various days of a week.

Days	Mon	Tue	Wed	Thurs	Fri	Sat
No. of books issued	120	130	110	115	135	110

Test at 5% level of significance whether the issuing of books is independent of a day.

(**Given:** $\chi^2_{5;0.05} = 11.07$)

Ans: $\chi^2_5 = 4.5833$

13. In an experiment on pea breeding, the following frequencies of

seeds were obtained:

Round and green	222
Wrinkled and green	120
Round and yellow	32
Wrinkled and yellow	150
Total	524

Theory predicts that the frequencies should be in proportion 8 : 2 : 2 : 1. Examine the correspondence between theory and experiment.

(Given $\chi^2_{3;0.05} = 7.815$)

Ans: $\chi^2_3 = 382.502$

14. A set of five similar coins is tossed 210 times and the result is

No. of heads	0	1	2	3	4	5
Frequency	2	5	20	60	100	23

Test the hypothesis that the data follow a binomial distribution.

(Given: $\chi^2_{5;0.05} = 11.070$)

Ans: $\chi^2_5 = 232.53684$

15. The figures given below are (a). the theoretical frequencies of a distribution and (b). the frequencies of a normal distribution having the same mean, standard deviation and the total frequency as in (a).

(a)	1	5	20	28	42	22	15	5	2
(b)	1	6	18	25	40	25	18	6	1

Apply the χ^2 test of goodness of fit.

(Given: $\chi^2_{6;0.05} = 12.592$)

16. The demand for a particular spare part in a factory was found to vary from day to day. In a sample study the following information was obtained.

Days	Mon	Tue	Wed	Thurs	Fri	Sat
No.of parts demanded	1124	1125	1110	1120	1126	1115

Test the hypothesis that the number of parts demanded does

not depend on the day of the week.

(**Given:** $\chi^2_{5,0.05} = 11.07$)

17. The table below gives the number of accidents that occurred in the certain factory on the various days of a particular week.

Days	Sun	Mon	Tue	Wed	Thurs	Fri	Sat
No. of accidents	6	4	9	7	8	10	12

Test at 5% level whether accidents are uniformly distributed over the different days.

(**Given:** $\chi^2_{6,0.05} = 15.592$)

Ans: $\chi^2_6 = 5.25$

18. In an experiment on pea breeding, a scientist obtained the following frequencies of seeds: 316 round and yellow, 102 wrinkled and yellow, 109 round and green and 33 wrinkled and green. Theory predicts that the frequencies of seeds should be in the proportion 9 : 3 : 3 : 1 respectively. Set a proper hypothesis and test it at 5% level of significance.

(**Given:** $\chi^2_{3,0.05} = 7.815$)

Ans: $\chi^2_3 = 0.355$

19. Two samples of sizes 9 and 8 gave the sums of squares of deviations from their respective means equal to 160 and 91 respectively. Can they be regarded as drawn from the same normal population?

(**Given:** $F_{0.05}(v_1 = 8, v_2 = 7) = 3.73$)

Ans: $F = 1.54$

20. From the following two sample values find out whether they have come from the same population.

Sample 1	17	27	18	25	27	29	27	23	17
Sample 2	16	16	20	16	20	17	15	21	

(**Given:** $F_{0.05}$ at (8,7) d.f. is 3.73)

Ans: $F = 4.2384$

21. In one sample of 8 observations, the sum of the squares of deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observation it was 102.6. Test whether this difference is significant at 5% level.

(**Given:** $F_{0.05}$ at (7,9) d.f. is 3.29)
Ans: $F = 1.057$