SSN College of Engineering, Kalavakkam – 603 110

Department of Mathematics

UNIT –III

TESTING OF HYPOTHESIS

ASSIGNMENT – III

Classes: IV sem IT- A&B, BME

Part – A

1. Mention two types of error in sampling.
2. Define critical region and critical value.
3. What is standard error?
4. Explain parameters and statistic.
5. Define null hypothesis and alternative hypothesis.
6. Write the standard error for single mean in large sample.
7. Write ant 2 properties of t-test.
8. Write any 2 applications of t-distribution.
9. Write the applications of F-test.
10. The value of F is always _____.
11. In a $r \times s$ contingency table, the d.f is _____
12. The important applications of χ^2 test are _____.
13. If $\chi^2 = 0$ then it implies _____.
14. Discuss the chi-square test of goodness of fit.
15. What is YATE's correction in χ^2 test.

PART-B

1. A sample of 1000 students from a university was taken and their average weight was found to be 112 kg with a S.D of 20kg. Could the mean weight of students in the population be 120kg?
2. A sample of 900 members has a mean 3.4cm and standard deviation 2.61 cm. Is the sample from a large population of mean 3.25cms and standard deviations 2.61cms? Test at 5% level of significance. If the population is normal and its mean is unknown, find the 95% fiducial limits of true mean.
3. The sales manager of a large company conducted a sample survey in states A and B taking 400 samples in each case. The results were in the following table. Test whether the average sales is same in the 2 states at 1% level.

	State A	State B
Average sales	Rs.2500	Rs.2200
S.D	Rs.400	Rs.550

4. A Mathematics test was given to 50 girls and 75 boys. The girls made an average grade of 76 with a SD of 6 and the boys made an average of 82 with a SD of 2. Test whether there is any significance difference between the performance of boys and girls.
5. A machine produced 20 defective articles in a batch of 400. After overhauling, it produced 10 defectives in a batch of 300. Has the machine improved?
6. A random sample of 500 apples was taken from a large consignment and 60 were found to be bad. Obtain the 98% confidence limits for the percentage of bad apples in the consignment.
7. In a certain factory there are two independent processes manufacturing the same item. The average weight in a sample of 250 items produced from one process is found to be 120gms with a S.D of 12gms, while corresponding figures in a sample of 400 items from the other process are 124 and 14. Is the difference between the mean weights significant at 1% level of significance?

8. In a large city A, 20% of a random sample of 900 school boys are using spectacles. In another large city B, 18.5% of random sample of 1600 school boys are using spectacles. Is the difference between the proportions significant?
9. The following table gives the lengths of 12 samples of Egyptian cotton taken from large consignments: 48, 46, 49, 46, 52, 45, 43, 47, 47, 46, 47, 50. Test if the mean length of the consignment be taken as 46.
10. A random sample of size 16 valves 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% confidence limits of the mean of the population.
11. A group of 10 rats fed on diet A and another group of 8 rats fed on diet B, recorded the following increase in weight (grams).

    Diet A 5 6 8 1 12 4 3 9 6 10

    Diet B 2 3 6 8 10 1 2 8

    Find the variances are significantly different.
12. Twelve students were given intensive coaching and tests were given before and after the coaching. Is there any improvement due to coaching?

Marks in I test (Before)	50	42	51	26	35	42	60	41	70	55	62	38
Marks in II test (After)	62	40	61	35	30	52	68	51	84	63	72	50

13. Two random samples gave the following data:

	Size	Mean	Variance
Sample I	8	9.6	1.2
Sample II	11	16.5	2.5

Can we conclude that the two samples have been drawn from the same normal population at 5% level of significance?

14. The theory predicts the proportion of beans, in the four groups A, B, C and D should be $9:3:3:1$. In an experiment with 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experimental result support the theory?
15. The following data are collected on two characters.

	Smokers	Non-smokers
Literates	83	57
Illiterates	45	68

Based on this, can you say that there is no relation between smoking and literacy at 5% level of significance?