

K19U 3018

(4)



29. Two sets of 100 students each were taught to read by two different methods. After the instructions were over, a reading test given to them revealed.

	Method 1	Method 2
Mean score	73.4	70.3
SD	8	10

30. During a country wide investigation, the incidence of T.B was found to be 1%. In a state, out of 400 sample, 5 were affected, whereas in another state 10 out of 1200 sample were affected. Does this indicate any significant difference.



Reg. No. :

Name :



K19U 3018

III Semester B.Sc.Hon's(Mathematics) Degree (Reg./Supple./ Improv.)
Examination, November 2019

(2016 ADMISSION ONWARDS)

BHM 304: THEORY OF SAMPLING AND ESTIMATION

Time : 3 Hours

Max. Marks : 60

SECTION - A

Answer any 4 questions out of 5. (4×1=4)

1. Define Standard error. What is the standard error of the mean of a sample of size n taken from a population with $SD \sigma$?
2. Define unbiased estimator. Give an unbiased estimator of the mean of a population.
3. What are the properties of MLE?
4. Define critical region.
5. Define power of a test.

SECTION - B

Answer any 6 questions out of 9. (6×2=12)

6. Distinguish between parameter and statistic.
7. Define consistency of an estimator.
8. State Central limit theorem.
9. A sample of size 400 is taken from a population where standard deviation is 16. Find the values of standard error and probable error.
10. Distinguish between point estimators and interval estimators.
11. If t is an unbiased estimator of the parameter θ , show that t^2 is a biased estimator of θ^2 .

P.T.O.



12. A random sample of 50 items drawn from a particular population has a mean 30 with a standard deviation 28. Construct 98% confidence interval estimate of the population mean.
13. If x has the binomial distribution with parameters n and p , show that the sample proportion, $\frac{x}{n}$ is an unbiased estimator of p .
14. Distinguish between one tailed and two tailed tests. Give one example for each.

SECTION - C

Answer any 8 questions out of 12.

(8×4=32)

15. A cubical die was thrown 9000 times and a 2 or 3 were obtained 3286 times. On the assumption of random trials, do the data indicate an unbiased one.
16. A sample of 900 days is taken from the meteorological records of a certain district and 100 of them are found to be foggy. What are the probable limits to the percentage of foggy days in the district.
17. If x_1, x_2, \dots, x_n be a random sample of size n from a normal distribution, with mean zero and variance σ^2 . Show that $\sum_{r=1}^n \frac{x_r^2}{n}$ is an unbiased estimator of σ^2 .
18. Write the confidence intervals of the mean when
- The population standard deviation is known
 - The population standard deviation is unknown.
19. Describe Bayesian estimation.
20. In a random selection of 50 of 600 road crossings in a town, the mean number of automobile accidents per year was found to be 3.8 and the sample standard deviation was 0.8. Construct a 90% confidence interval for the mean number of automobile accidents per crossing per year.



21. A random sample of size 20 is taken from a normal population with variance 225 has sample mean 64.3. Find the confidence interval for the mean.
22. The average marks in mathematics of a sample of 100 students was 51 with a standard deviation of 6 marks. Could this have been a random sample from a population with average marks of 50.
23. Random samples drawn from two places gave the following data relating to the heights of children.

	Place A	Place B
Mean height	68.5	68.58
SD	2.5	3.0
Sample size	1200	1500

Test at 5% level that the mean height is the same for the children at two places.

24. Explain
- Simple random sampling
 - Stratified sampling.
25. A machine puts out 16 imperfect articles in a sample of 500. After the machine is overhauled, it puts out 3 imperfect articles in a batch of 100. Has the machine improved.
26. In a random sample of 125 people, 68 people consumes soft drinks. Test the hypothesis that the proportion of people consumes soft drink is 0.5.

SECTION - D

Answer any 2 questions out of 4.

(2×6=12)

27. A random sample of size 100 is taken from an infinite population having the mean $\mu=76$ and the variance =256. What is the probability that the sample mean \bar{X} will be between 75 and 78.
28. Obtain an unbiased estimator of $\theta = \sigma^2$ for a normal distribution with mean μ and variance σ^2 .