K17U 2674

Reg. No. : ....

Name : ....

III Semester B.Sc. Hon's (Mathematics) Degree (Reg.)
Examination, November 2017
BHM 304 : THEORY OF SAMPLING AND ESTIMATION
(2016 Admission)

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer **any 4** questions out of **5** questions, **each** question carries **1** mark.

1. Define a statistic and give an example.

2. Define an unbiased estimator.

3. What is critical region ?

4. Define the probable error of a distribution.

5. Define null hypothesis.

(1×4=4)

SECTION – B

Answer **any 6** questions out of **9** questions **each** carrying **2** marks.   (2×6=12)

6. A coin is tossed 400 times and it turns up head 212 times. Discuss whether the coin may be unbiased.

7. S.T. sample median is a consistent estimator for the population mean of a normal population.

8. Define maximum likelihood estimator.

9. What are the two types of errors in testing of hypothesis ?

10. Describe one-tailed and two-tailed tests.

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. Distinguish between point and interval estimators.

13. Define standard error and give example.

14. A random sample of size 100 has mean 10, the population variance being 25. Find the interval estimate of the population mean with confidence i) 95% and ii) 99%.

SECTION – C

Answer **any 8** questions out of **12** :   **(8×4=32)**

15. Show that sample mean is a sufficient estimator for the parameter λ of a Poisson distribution.

16. For random sampling from normal population, find the maximum likelihood estimators of
   i) The population mean when the population variance is known,
   ii) The population variance, when the population mean is known.

17. Samples of size 2 are taken from the population 1, 2, 3, 4, 5, 6 with replacement and without replacement. Find
   a) Mean of the population
   b) Standard deviation of the population
   c) Mean of sampling distribution of means
   d) Standard deviation of sampling distribution of means.

18. Given the following information relating to two places A and B. Test whether there is any significant difference between their mean wages

	A	B
Mean wages	47	49
Standard deviation	28	40
No. of workers	1000	1500

19. A, out of a sample of 1000 persons 100 were found to be vegetarians, while in another village B, out of 1500 persons 180 were found to be vegetarians. Do you find a significant difference in the food habits of the people of the two villages.

20. A normal population has a mean of 0.1 and standard deviation of 2.1. Find the probability that the mean of a sample of size 900 will be negative.

21. Write the test procedure for testing the significance for the difference of proportions of two large samples.

22. Describe Bayesian estimation.

23. Derive the $100(1-\alpha)$% confidence interval for mean of a normal population when standard deviation σ is known.

24. Describe simple random sampling and stratified sampling

25. Obtain an unbiased estimator of σ^2 for a normal distribution with mean μ and variance σ^2.

26. A random sample of size 100 is taken from an infinite population having the mean 76 and variance 144. What is the probability that sample mean will lie between 70 and 78.

SECTION – D

Answer **any 2** questions out of **4** :   **(2×6=12)**

27. State and prove central limit theorem.

28. Define the terms :
   i) Finite population correction
   ii) Sampling fluctuation
   iii) Efficiency
   iv) Significance level.
   v) Critical value
   vi) Point estimate.

29. Write the procedure for testing of hypothesis and give a description on important tests of hypothesis.

30. Write the test procedure for testing the significance of the difference between means of two large samples.

———————————