THIRD SEMESTER B.Sc DEGREE EXAMINATION, NOVEMBER 2022

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U STA3 C02 - PROBABILITY DISTRIBUTIONS AND PARAMETRIC TESTS

(Statistics - Complementary Course)

(2019 Admission onwards)

Time : 2.00 Hours   Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. Under what conditions binomial distribution tends to poisson distribution ?

2. Write the probability density of a normal variate with mean 20 and Standard deviation 4.

3. Define Central Limit Theorem.

4. If X follows normal distribution with parameters $\mu = 0$ and $\sigma = 4$. What about its mean, median and mode?

5. Define a random sampling.

6. Define statistic. Give an example.

7. Define Type I and Type II error

8. What is a p value?

9. Write down the test statistic for testing the significant difference between means of two populations in case of large sample test.

10. A survey claims that 9 out of 10 doctors recommend aspirin for their patient with headaches. To test this claim against the alternative that the actual proportion of doctors who recommend aspirin is less than 0.90, a random sample of 100 doctors results in 83 who indicate that they recommend aspirin. Find the value of the test statistic.

11. The mean difference between 9 paired observation is 15 and standard deviation of difference is 5. Find the value of t statistic used in paired t test.

12. The standard deviation of the scores of 10 candidates in an examination is 3.5. Is their justification in the belief that the s.d of the population is less than 3.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)
Answer *all* questions. Each question carries 5 marks.

13. Explain fitting of binomial distribution.

14. If X follows poisson distribution such that $P(X=2)= 9P(X=6)$. Find the mean and variance of X.

15. Mention the advantages and disadvantages of non-probability sampling.

16. The mean weight of a sample of 100 students is 50Kgs with S.D 3 Kgs .Is it unreasonable to accept the claim that the mean weight of all students is 51Kgs.

17. In a sample of 100 people the number of those suffering from T.B was found to be 5. Does this contradict the assumption that the proportion of T.B patients in the whole population is less than 0.04.

18. A certain stimulant administered to each of the 12 patients resulted in the following increase in blood pressure 5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4, 6. Can it be concluded that the stimulus will in general be accompanied by an increase in blood pressure?

19. The mean life of a sample of 10 electric bulbs from batch A was found to be 1456 hours with s.d. 423 hours. A sample of 17 bulbs from batch B shows a mean life of 1280 hours with s.d. 398 hours. Is there significance difference between means of two batches?

(Ceiling: 30 Marks)

Part C (Essay questions)
Answer any *one* question. The question carries 10 marks.

20. Mean and variance of a binomial distribution are 8 and 4 respectively. Find the probability of
    (a) Exactly 3 successes   (b) Less than 3 successes   (c) More than 2 successes

21. Describe a procedure for testing the equality of variances of two normal populations.

(1 × 10 = 10 Marks)

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