TB254183N

Reg. No :.....

Name :.....

BACHELOR'S DEGREE (C.B.C.S) EXAMINATION, MARCH 2025

2018, 2019, 2020, 2021, 2022 ADMISSIONS SUPPLEMENTARY

SEMESTER IV - COMPLEMENTARY COURSE 2 (STATISTICS)

ST4C03B18 - Statistical Tools

Time : 3 Hours **Maximum Marks : 80**

Part A

I. Answer any Ten questions. Each question carries 2 marks **(10x2=20)**

1. Explain scatter diagram.
2. When is rank correlation preferred over product moment correlation?
3. What will be the nature of the regression lines when r = 0?
4. If the correlation co-efficient between two variables x and y is 0.8, then what is the correlation co-efficient between 8x and 4y?
5. State the multiplication theorem on probability.
6. Explain intersection of two events.
7. Define conditional probability.
8. Write down the p.d.f. of the binomial distribution with parameters n = 4 and p =1/3.
9. The mean and variance of a Binomial distribution are 6 and 4 respectively. Find the parameters of the distribution.
10. Give the test statistic for testing whether proportion in a population is equal to a specified value.
11. Explain one-tailed and two-tailed tests.
12. Give one example each of a simple hypothesis and a composite hypothesis.

Part B

II. Answer any Six questions. Each question carries 5 marks **(6x5=30)**

13. Given the following data, find the probable value of x when y = 30

    $\bar{x} = 27.6$, $\bar{y} = 14.8$, $\sigma_x = 40$, $\sigma_y = 20$, $r = 0.8$

14. Given the following data, find the probable yield when rainfall is 29"

	Rainfall	Production
Mean	25"	40 units per acre
Standard deviation	3"	6 units

    Co-efficient of correlation between rainfall and production = 0.8

15. Given the following data estimate the value of y when $x = 25$

    $\sum x = 30$, $\sum y = 5$, $\sum x^2 = 670$, $\sum y^2 = 285$, $\sum xy = 334$ and $n = 12$

16. If A and B are independent events, show that (i) A and B^c are independent (ii) A^c and B^c are independent.
17. The contents of two bags are as follows. Bag 1: 2 white and 3 black balls, Bag 2: 3 white and 2 black balls. A bag is selected at random and then a ball is drawn from it. Find the probability that it is a white ball.
18. A box contains 4 green and 3 red balls. Three balls are drawn out at random. Let X denote the number of green balls obtained. Write down the probability distribution of X.

19. Define Binomial distribution. If X follows binomial distribution with parameters n and p, write down the expressions for the mean and variance of X.

20. The mean life of 100 tyres taken from a normal population is found to be 25325 kms with a standard deviation of 120 kms. Can it be claimed that the mean life in the population is 25000 kms?

21. Out of a sample of 500 people from a certain district A, 448 were literates. Can it be reasonably claimed that 90% of the populations of district A are literates?

Part C

III. Answer any Two questions. Each question carries 15 marks **(2x15=30)**

22. Find Karl Pearson's co-efficient of correlation from the following data

x:	28	45	40	38	35	33	40	32	36	33
y:	23	34	33	34	30	26	28	31	36	35

23. Compute the Spearman's rank correlation co-efficient from the following data

Sales	50	56	54	60	67	63	60	62	68	69
Expenses	21	23	24	27	32	34	28	30	33	32

24. (a) Define a binomial distribution. (b) A basket contains 20 bad oranges and 80 good oranges. 3 oranges are drawn at random from this basket. Using binomial law find the probability that (i) exactly 2 (ii) atleast 2 and (iii) atmost 2 are good oranges.

25. Before an increase in excise duty on tea 400 people out of a sample of 500 people were found to be tea drinkers. After an increase in excise duty 400 people were found to be tea drinkers out of a sample of 600 people. Tests whether there is a significant decrease in the consumption of tea.