TB244299R

22/4/1 OC

Reg. No :.....

Name :.....

BACHELOR'S DEGREE (C.B.C.S) EXAMINATION, MARCH 2024

2022 ADMISSIONS REGULAR

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. 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?
2. In the case of simple correlation, explain positive and negative correlation.
3. Explain why there are two regression lines for a bivariate data.
4. Distinguish between correlation and regression.
5. Show that $P(A^c) = 1 - P(A)$ with usual notations.
6. Define complement of an event.
7. Define a random experiment.
8. Distinguish between discrete and continuous random variables.
9. Let X denote the number obtained when a dice is tossed. Find E(X).
10. Distinguish between Simple and Composite hypotheses.
11. Explain power of a test.
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 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 $n = 12$
14. Given the two regression lines $x+2y-5 = 0$ and $2x+3y-8 = 0$, which one is the regression line of x on y?
15. If for a bivariate data (x,y), $r = 0.48$, $P_{xy} = 36$, $\sigma_x^2 = 16$, find the standard deviation of y.
16. Define the following (i) Conditional probability (ii) Independent events (iii) Mutually exclusive events.
17. There are two bags containing 3 white & 7 black balls and 8 white & 2 black balls respectively. A bag is chosen and a ball is drawn from it. Find the probability that it is a black ball.
18. Define p.d.f. of a random variable. State the properties of p.d.f. of a random variable.
19. Let X denote the sum of the numbers obtained when two dice are tossed. Write down the probability distribution of X.
20. Give the procedure to test whether the mean of a population is equal to a specified value using a large sample taken from the population.
21. Explain the procedure for testing equality of proportions of two normal populations using large samples.

Part C

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

22. Find Spearman's rank correlation co-efficient from the following data

x:	90	82	82	82	81	71	63	63	49	38
y:	75	72	71	71	71	71	50	40	32	32

23. 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

24. (a) Write down the p.d.f. of a Normal distribution. (b) In a normal distribution, 20% of the observations are greater than 70 and 10% of the observations lie between 60 and 70. Find the mean and standard deviation of the distribution.

25. A sample of 200 boys who passed the SSLC exam were found to have a mean mark of 75% with a standard deviation of 5. The mean mark of a sample of 100 girls who passed the SSLC exam was found to be 77% with a standard deviation of 4. Does this indicate any difference between the performance of boys and girls in general?