TB174475D

Reg. No: .....

Name: .....

B. A. DEGREE (C.B.C.S.S) EXAMINATION, MARCH 2025
(2017 & 2016 Admissions Supplementary)
SEMESTER IV- COMPLEMENTARY COURSE (STATISTICS)
ST4CS02B – STATISTICAL TOOLS
(For Sociology)

Time: Three Hours **Maximum Marks: 80**

PART A

I Answer all questions. Each question carries 1 mark.

1. Distinguish between Correlation and Regression.
2. When are the two events said to be mutually exclusive?
3. Define random Experiment.
4. What is meant by type I error?
5. Define power of a test.
6. Define null and alternative hypotheses.

(6x1=6)

PART B

II Answer any seven questions. Each question carries 2 marks

7. Distinguish between discrete and continuous random variables.
8. Which are the different types of Correlation?
9. Explain Scatter Diagram.
10. Give the classical definition of Probability.
11. Give the expression for Karl Pearson's coefficient of correlation.
12. State the addition theorem on probability for 2 events.
13. Define Expectation of a random variable.
14. A coin and a die are tossed. Write down the sample space.
15. Define Binomial distribution.
16. What do you mean by statistical hypothesis?

(7x2=14)

PART C

III Answer any five questions. Each question carries 6 marks

17. Explain the different types of correlation.
18. If n =10, $\sum x = 35, \sum y = 28, \sum x^2 = 203, \sum y^2 = 140$ *and* $\sum xy = 168$ find the two regression lines.
19. Define the following (i) Conditional probability (ii) Independent events (iii) Mutually exclusive events.

20. If S= {1,2,3,4,5,6,7,8,9,10} A={1,2,5,7} B={3,6,9,10} C={4,5,6,8} D={1,8,9,10} Find (i) AUB (ii) (AUC) ∩D (iii) A∩ (BUC) (iv) show that $(AUB)^{\circ} = A^{\circ} \cap B^{\circ}$
21. Evaluate k if the following is probability density functions also find P [X≤ 2] *and* $P[0 < x < 3]$. Given that f(0) = k/2, f(1) = k/5 , f(2) = k/20 , f(3) = k/4 and f(x) = 0 elsewhere.
22. What are the properties of Binomial distribution?
23. Define the terms (i) Null hypothesis (ii) Alternative hypothesis (iii) Significance level of a test.
24. Find Spearman's rank correlation from the following data

X	59	65	45	52	60	62	70	55	43	49
Y	75	70	55	65	60	69	80	68	51	61

(5x6=30)

PART D

IV Answer any two questions. Each question carries 15 marks

25. Obtain the two regression equations for the following data

Marks in Sociology	45	56	39	54	45	40	56	60	30	35
Marks in Statistics	40	56	30	44	36	32	45	42	20	36

26. (i) State Baye's Theorem
    (ii) A bag contains 3 white and 4 black balls. Another bag contains 2 white and 4 black balls. A ball is drawn from one of the bags and found to be white. What is the Probability that it is from the first bag?
27. (i) State and prove addition theorem on probability.
    (ii) A bag contains 4 red and 5 black balls. Two balls are drawn out at random. What is the probability that
    (a) Both are red
    (b) Both are black
    (c) One is red and the other is black.
28. 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. Using standard error of proportion state whether there is a significant decrease in the consumption of tea.

(2x15=30)