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Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MAY 2024

Fourth Semester

Complementary Course—Statistics

STATISTICAL TOOLS

(For B.Sc. Psychology)

[2013–2016 Admissions]

Time : Three Hours Maximum Marks : 80

Part A (Short Answer Questions)

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Define a Statistical population.
2. Define systematic sample.
3. What is a scatter diagram ?
4. Obtain the formula for rank correlation coefficient.
5. State the regression equation of y on x.
6. Give the mean and variance of BD.
7. What is the mode of ND ?
8. Define simple hypothesis.
9. Define Type II error.
10. What is p-value ?

(10 × 1 = 10)

Part B (Brief Answer Questions)

Answer any **eight** *questions.*
Each question carries 2 *marks.*

11. Distinguish between SRSWR and SRSWOR.
12. What are the disadvantages of census method ?
13. What is a cluster sample ?
14. Define Karl Pearson's Coefficient of correlation.
15. Distinguish between Linear and Non-linear correlation.

Turn over

16. Who coined the term 'regression' and what is its literal meaning ?
17. Write the pdf of BD.
18. In a ND, what are the values of β_1 and β_2 ?
19. In $N(\mu,\sigma)$, under what limits 95 % of observations are lying ?
20. Distinguish between Null and Alternative hypothesis.
21. What are the assumptions of t-test for testing the mean of a population ?
22. When a test is found to be significant, what will be your conclusion ?

$(8 \times 2 = 16)$

Part C (Descriptive/Short Essay Type Questions)

Answer any **six** *questions.*
Each question carries 4 *marks.*

23. What are the merits of sampling over census method ?
24. How will you select a stratified random sample ?
25. Calculate Karl Pearson's Coefficient of correlation for the following data :—

x	:	1	2	4	5	8	9
y	:	4	6	7	10	11	15

26. Given two regression lines :

$$2x + 18y = 326$$
$$x + 2y = 33$$

Obtain $\bar{x}, \bar{y}$ and r.

27. What are the salient features of binomial distribution ?
28. The mean and variance of BD are 16 and 8. Find :
    (i) P(X = 0).
    (ii) P(X = 1).
    (iii) $P(X \geq 2)$.
29. What are the important properties of ND ?
30. Distinguish between Parametric and Non-parametric test of hypothesis.
31. Explain Wilcoxen's rank sum test.

$(6 \times 4 = 24)$

Part D (Long Essays)

Answer any **two** *questions.*
Each question carries 15 *marks.*

32. Find the two regression lines for the following data :

x	:	65	66	67	67	68	69	71	73
y	:	67	68	64	68	72	70	69	70

Calculate the expected vaue of y when $x = 70$.

33. Average IQ of a group of 800 children is 98. The standard deviation is 8. Assuming normality find the expected number of children having IQ between 100 and 120.

34. A random sample of 200 villages was taken from a district and the average population was found to be 420 with a standard deviation 50. Another random sample of 200 villages taken from the district gave an average population of 480 with a SD 60. Is the difference between the averages of the two samples significant at $\alpha = 0.05$.

35. For the following data test the hypothesis that the drug is no better than sugar pills for curing colds :

		Helped	Harmed	No effect
Drug	:	50	12	18
Sugar	:	40	14	28

$(2 \times 15 = 30)$