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Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2022

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. What is a random sample ?
2. Define sampling unit.
3. What is correlation ?
4. Given $b_{yx} = -0.4$, $b_{xy} = -0.9$ What is r ?
5. Define binominal distribution.
6. Obtain the relationship between mean and variance of BD.
7. What are the limits with in which 99% of observations are lying in a standard normal distribution ?
8. Define hypothesis.
9. Define type I error.
10. What do you mean by degrees of freedom ?

(10 × 1 = 10)

Part B (Brief Answer Questions)

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

11. Distinguish between census and sampling.
12. Distinguish between probability sampling and non-probability sampling.

Turn over

13. What is a stratified random sample ?
14. Define Karl Pearson's Co-efficient of correlation.
15. What is the principle of least squares ?
16. At which point the two regression lines intersect ?
17. How will you interpret the values $r = 0$, $r = -0.95$, $r = +1$.
18. What is the probability for getting 2 heads in 3 tosses of a fair coin ?
19. In a standard Normal distribution find $P(0 \leq Z \leq \infty)$.
20. What is the difference between p-value and significance level ?
21. Distinguish between simple and composite hypothesis.
22. Define critical region.

(8 × 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 of enquiry ? -
24. Explain the method of selecting a systematic sample.
25. Given the following data :

$\sum x = 56, \sum y = 40, n = 8$
$\sum x^2 = 524, \sum y^2 = 256, \sum xy = 364.$

Calculate the Karl Pearson's Co-efficient of Correlation.

26. How will you identify the regression lines ?
27. You are given the following data :

		x	y
Arithmetic mean	...	36	85
Standard deviation	...	11	8

Correlation coefficient between x and y is 0.66.

a) Find the two regression equations.

b) Estimate the value of x when $y = 75$.

28. An experiment succeeds twice as often as it fails. Find the probability of getting 3 successes in 6 trials.

29. If X is normally distributed with mean 15 and variance 16, find P (12 < X < 20).

30. Explain the test procedure for testing a nulli hypothesis against an alternative hypothesis.

31. How will you test the mean of a population using large and small samples ?

(6 × 4 = 24)

Part D (Long Essays)

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

32. Calculate Karl Pearson's Coefficient of Correlation for the data given below

x	:	28	26	32	31	37	29	36	34	39	40
y	:	75	74	82	81	90	80	88	85	92	95

33. In a distribution exactly normal, 58% of the items are under 75 and 4% are over 80. Find the mean and standard deviation of the distribution.

34. Based on the following data, examine whether educational background and belief in astrology are independent of each other.

		Have Horoscope	Do not have horoscope
Graduates	...	287	147
Undergraduates	...	437	219
Non-matriculates	...	195	185

35. Briefly explain the different non-parametric tests of hypothesis.

(2 × 15 = 30)