

Reg. No. : .....

Name : .....

**Third Semester B.Sc. Degree Examination, March 2022**

**First Degree Programme under CBCSS**

**Statistics**

**Complementary Course for Psychology**

**ST 1331.5 – STATISTICAL METHODS FOR PSYCHOLOGY III**

**(2019 & 2020 Admission)**

Time : 3 Hours

Max. Marks : 80

(Use of Statistical Table and Calculator are permitted)

**SECTION – A**

Answer all questions. Each question carries 1 mark.

1. When the rank of two groups are same, then the rank correlation coefficient is \_\_\_\_\_.
2. What is meant by perfect correlation?
3. If there are two variables  $X$  and  $Y$ . there can be at most \_\_\_\_\_ regression lines.
4. The range of distribution function  $F(x)$  lies between \_\_\_\_\_.
5. What is the relationship between distribution function and density function?
6. The statistical technique used for the prediction of variables is \_\_\_\_\_.
7. Define coefficient of colligation.



8. If  $X$  is a continuous random variable, then  $P(a \leq X \leq b)$  is \_\_\_\_\_.
9. Define T score.
10. Discuss about skewness of a normal curve.

(10 × 1 = 10 Marks)

#### SECTION – B

Answer any eight questions. Each question carries 2 marks.

11. Distinguish between linear and nonlinear correlation.
12. Define rank correlation coefficient.
13. What is scatter diagram?
14. What is meant by dissociation of attributes?
15. Write down the normal equation for fitting  $Y = a + bX$ .
16. State the relationship between correlation coefficient and regression coefficient.
17. Distinguish between Correlation and Association.
18. Distinguish between discrete and continuous random variable.
19. Define probability density function and write down its properties.
20. What is random variable? Give an example.
21. Define binomial distribution.
22. Define regression equation.
23. Examine the consistency of the following data.  
 $N = 1000, (A) = 600, (B) = 500, (AB) = 50$
24. Write any two applications of normal curve.
25. Explain stanine score.
26. How to ascertain kurtosis with the help of  $\beta_2$ ?

(8 × 2 = 16 Marks)



### SECTION – C

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

27. Karl Pearson's correlation coefficient between two variables X and Y is 0.28 their covariance is 7.6. If the variance of X is 9, find the standard deviation Y.
28. Distinguish between correlation and regression.
29. Prove that Correlation coefficient lies between -1 and +1.
30. What are the uses of regression analysis?
31. Define distribution function. Explain its properties.

32. Given 
$$F(x) = \begin{cases} 0, & x < 0 \\ x^2, & 0 \leq x \leq 1 \\ 1, & x > 1 \end{cases}$$

Determine :

- (a)  $P(X \leq 0.5)$
  - (b)  $P(0.5 \leq X \leq 0.8)$
  - (c)  $P(X > 0.9)$
33. Prove that two independent variables are uncorrelated. Also by giving an example prove that the converse is not true.
  34. When are two attributes said to be positively associated and negatively associated?
  35. Define Yule's coefficient of association.
  36. Derive the mean of binomial random variable.
  37. What are the uses of Z score?
  38. How to convert raw score to Z score and T score?

**(6 × 4 = 24 Marks)**

### SECTION – D

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

39. (a) Explain briefly about the methods of studying correlation.
- (b) Find the rank correlation coefficient of the following data :

Series A	115	109	112	87	98	120	98	100	98	118
Series B	75	73	85	70	76	82	65	73	68	80

N – 2668



40. (a) Derive mean and variance of Poisson distribution.  
 (b) If  $X$  and  $Y$  are independent Poisson random variates such that  $P(X = 1) = P(X = 2)$  and  $P(Y = 2) = P(Y = 3)$ . Find the variance of  $X - 2Y$ .
41. (a) State and prove the properties of regression coefficient.  
 (b) If two regression equations  $8X - 10Y + 66 = 0$ ,  $40X - 18Y = 214$  and variance of  $x = 9$  are given, then find  
 (i) the mean value of  $X$  and  $Y$   
 (ii) the correlation coefficient between  $X$  and  $Y$ .
42. What do you understand by consistency of a given data? How do you check it?
43. The probability density of a random variable  $X$  is

$$f(x) = \begin{cases} 0 & x \leq -a \\ \frac{a+x}{a^2} & -a < x \leq 0 \\ \frac{a-x}{a^2} & 0 < x \leq a \\ 0 & x \geq a \end{cases}$$

- (a) Verify that  $\int_{-\infty}^{\infty} f(x) dx = 1$ .
- (b) Compute cumulative distribution function.
44. An instructor gives an exam. For this exam the distribution of raw score has a mean of 57 with standard deviation 14. The instructor would like to simplify the distribution by transforming all scores into a new, standardized distribution with mean 50 and standard distribution 10. What happens to the score of Maria who has raw score of  $X = 64$  in the original distribution and Joe whose original raw score is  $X = 43$ .

(2 × 15 = 30 Marks)