Reg. No. : ....

Name : ....

Third Semester B.Sc. Degree Examination, March 2021

First Degree Programme under CBCSS

Statistics

ST 1331.5 – STATISTICAL METHODS FOR PSYCHOLOGY – III

(2017 and 2018 Admission)

Time : 3 Hours

Max. Marks : 80

Use of calculator and statistical Table is permitted.

SECTION – I

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

1. The range of correlation coefficient is ——————.

2. The two regression lines of the variables X and Y intersect at the point ——————

3. Given the regression coefficients of x on y and y on x are 0.85 and 0.89 respectively. Find the correlation coefficient.

4. Write down the formula for Spearman's rank correlation coefficient.

5. Find the mean and variance of binomial distribution with parameters $n = 20$ and $p = 0.5$.

6. Define continuous random variable.

7. Give the sample space of tossing two unbiased coins at a time.

8. Define probability mass function.

9. Define T-score.

10. For a sample with a mean of 40 and a standard deviation of 12, find the Z-score corresponding to $X = 58$.

<div align="right">(10 × 1 = 10 Marks)</div>

SECTION – II

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

11. Write down the normal equations for fitting $y = a + bx$.

12. Define regression equations.

13. Distinguish between correlation and association.

14. Define Karl Pearson's correlation coefficient.

15. If the two lines of regression are $x + 2y - 5 = 0$ and $2x + 3y - 8 = 0$, find the mean of X and Y.

16. What you mean by consistency of data?

17. Define coefficient of colligation.

18. If $P(A) = 0.20$, $P(B) = 0.45$ and $P(A \cap B) = 0.09$, find $P(A \cup B)$.

19. Check whether the following function is a probability function

$$P(x) = \frac{x - 2}{2}, \; x = 1,2,3,4 \text{ and } P(x) = 0, \text{ otherwise.}$$

20. Find the probability that a random variable having the standard normal distribution will take on a value between 0.87 and 1.28.

21. Mention any two applications of normal distribution.

22. Define Poisson distribution and obtain its mean.

<div align="right">(8 × 2 = 16 Marks)</div>

<div align="right">K – 2401</div>

SECTION – III

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

23. Explain scatter diagram method of studying correlation.

24. Sketch a scatter plot and comment the correlation between X and Y.

    X: 2 1 3 0 4

    Y: 6 5 3 7 4

25. Rank the following scores and compute the Spearman correlation

    X: 2 12 9 10

    Y: 7 38 6 19

26. Explain Yule's coefficient of association.

27. Use the linear equation $Y = 2X - 7$ determine the value of Y for each of the following values of X: 1,3,5,10.

28. For the following scores, find the regression equation for predicting Y from X.

    X: 3 6 3 3 5

    Y: 6 1 4 3 1

29. Explain association and disassociation with example.

30. Define distribution function and give its properties.

31. Find the value of k and construct the distribution function for the following distribution.

x:	-2	-1	0	1	2	3
P(x):	0.1	k	0.2	2k	0.3	K

(6 × 4 = 24 Marks)

SECTION – IV

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

32. Calculate Karl Person's coefficient of correlation for the following data:

Age of husband (years): 23 27 28 29 30 31 33 35 36 39

Age of wife (years): 18 22 23 24 25 26 28 29 30 32

33. From the data given below, find

(i) two regression coefficients

(ii) two regression equations

(iii) coefficient of correlation between the marks in Economics and Statistics

Marks in Economics: 25 28 35 32 31 36 29 38 34 32

Marks in statistics: 43 46 49 41 36 32 31 30 33 39

34. Ten competitors in a beauty contest are ranked by three judges in the following order

Judge I : 1 6 5 10 3 2 4 9 7 8

Judge II: 3 5 8 4 7 10 2 1 6 9

Judge III: 6 4 9 8 1 2 3 10 5 7

Use the rank correlation coefficient to determine which pair of judges has the nearest approach to common tastes in beauty.

35. A random variable X has the following probability function

x: 0 1 2 3 4 5 6 7 8

$p(x)$: k $3k$ $5k$ $7k$ $9k$ $11k$ $13k$ $15k$ $17k$

(i) Find k

(ii) Evaluate $P(X < 3)$ and $P(X \geq 3)$

(iii) Find the distribution function of X.

(2 × 15 = 30 Marks)