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K – 2461

Reg. No. :

Name :

Third Semester B.Sc. Degree Examination, March 2021

First Degree Programme under CBCSS

Statistics

Complementary Course for Psychology

ST 1331.5 – STATISTICAL METHODS FOR PSYCHOLOGY III

(2019 Admission Regular)

Time : 3 Hours

Max. Marks : 80

Use of scientific calculator and statistical tables are allowed.

SECTION – A

Answer all questions. Each question carries 1 mark.

1. Give an example for positive correlation.
2. Write Spearman's rank correlation coefficient.
3. What are the limits of regression coefficients?
4. Write the regression equation of X on Y.
5. Define coefficient of colligation.
6. Write an example for a discrete random variable.
7. Define sample space.

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8. Write the relationship between distribution function and probability density function in the case of continuous random variable.
9. What is T-score?
10. Define Z-score.

(10 × 1 = 10 Marks)

SECTION – B

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

11. Distinguish between discrete and continuous variables.
12. If the correlation between A and Y is 0.9 and the regression coefficient of Y on X is 0.6 find the regression coefficient of X on Y.
13. What is meant inverse correlation? Give an example.
14. Define Binomial random variable.
15. Write any two methods for studying correlation between two variables.
16. Define probability mass function.
17. Let X be a continuous random variable with density function $f(x) = \frac{1}{2}$, $0 < x < 2$.
Find $P(X = 1]$
18. Write the normal equation for fitting a straight line.
19. For the regression lines $4x - 5y = -33$ and $20x - 9y = 107$ find the mean values of x and y.
20. Describe consistency of data.
21. Define association between two attributes.
22. If the probability mass function of a random variable X is $f(x) = kx$, $x = 1, 2, 3$ find $P(X \geq 1.8)$.
23. Define skewness and kurtosis.

24. Define Stanine-score.
25. Define standard error of an obtained score.
26. Why do we need normalized scores?

(8 × 2 = 16 Marks)

SECTION – C

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

27. A sample of 10 observation are collected and the following results are obtained.
 $\Sigma x = 15$, $\Sigma y = 25$, $\Sigma xy = 20$, $\Sigma x^2 = 115$ and $\Sigma y^2 = 200$. Using this information compute the correlation coefficient between X and Y .
28. Compare correlation and regression.
29. Describe scatter diagram.
30. How does regression useful for prediction?
31. Explain Yule's coefficient of association.
32. Check whether the function $f(x) = 2x(1-x)$, $0 < x < 2$ is a probability density function.
33. Derive the variance of a Binomial distribution.
34. Define distribution function. Write its properties.
35. Derive the relationship between coefficient of colligation and Yule's coefficient of association.
36. Correlation coefficient and covariance between two variable X and Y are respectively 0.3 and 8. If the variance of Y is 9 find the standard deviation of X .
37. If X is a Normal random variable with mean 11 and variance 2.25, find the $P(X > 12.5)$ and $P(5 < X < 14)$
38. Describe the skewness and kurtosis of Normal curve.

(6 × 4 = 24 Marks)

SECTION – D

Answer any two questions. Each question carries 15 marks.

39. Compute the sample correlation coefficient for the data. Explain the nature of relationship.

X	26	30	40	42	50	28	34	27	23	31
Y	24	26	32	39	46	22	30	23	20	30

40. A random variable X has the following probability function.

x	-1	0	2
$P(X=x)$	k	$2k$	$3k$

- (a) Determine the value of k
- (b) Find $P(X \leq 0)$ and $P(X \geq 0)$
- (c) Write down the distribution function of X .
41. Fit a linear regression for predicting Y on X using the following data and predict the value of Y for $X = 18$.

X	8	15	16	3	10	12
Y	27	46	51	9	32	52

42. Derive the mean and variance of Poisson distribution. If X is a random variable following Poisson distribution with mean 5 find $P(X \geq 2)$.
43. Find Spearman's rank correlation coefficient for the following data :
- | | | | | | | | | | | |
|---|-----|-----|-----|----|----|-----|----|-----|-----|----|
| A | 117 | 109 | 115 | 90 | 96 | 120 | 96 | 100 | 119 | 96 |
| B | 75 | 74 | 85 | 70 | 76 | 82 | 65 | 74 | 80 | 67 |

44. (a) Explain Normal distribution.
- (b) Let X be a Normal random variable with $P(X < 35) = 0.15$ and $P(X > 65) = 0.1$. Compute the mean and variance of X .

(2 × 15 = 30 Marks)