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K – 2242

Reg. No. :

Name :

Third Semester B.A. Degree Examination, March 2021.

First Degree Programme under CBCSS

Statistics

Complementary Course for economics

ST 1331.4 – STATISTICS III

(2017 and 2018 Admn)

Time : 3 Hours

Max. Marks : 80

Instructions : Use of calculator and statistical Table is permitted

SECTION – A

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

1. Define random experiment.
2. If Laspeyre's price index is 324 and Paasche's price index is 144, then find Fisher's ideal index.
3. If the standard deviation of Poisson variate is 2, give the mean.
4. What is association of attributes?
5. Define index number.
6. What is the relation between Yule's coefficient and coefficient of colligation?
7. Define correlation coefficient.

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8. If the coefficient of correlation is 0.7, what is the coefficient of alienation?
9. State the addition theorem of probability.
10. Define binomial distribution.

(10 × 1 = 10 Marks)

SECTION – B

Answer any eight questions. Each carries 2 marks

11. Given the cell frequencies for two attributes $(AB) = 90$, $(aB) = 60$, $(Ab) = 180$ and $(ab = 30)$, find coefficient of colligation.
12. Define Poisson distribution. Give some situations where Poisson distribution may be successfully employed.
13. What is consumer price index? State its uses.
14. Define splicing and deflating of index numbers.
15. Distinguish between correlation and regression.
16. Discuss the properties of correlation coefficient.
17. Define
 - (a) Random experiment and
 - (b) Sample space with examples.
18. Discuss the characteristics of normal distribution.
19. What is the chance that a leap year selected at random will contain 53 Sundays?
20. Can $Y = 5 + 2.8 X$; $X = 3 - 0.5 Y$ be the estimated regression equation of Y on X and X on Y respectively? Explain.
21. What are the limitations of index numbers?
22. Given $P(A) = 0.30$, $P(B) = 0.78$ and $P(A \cap B) = 0.16$. Find
 - (a) $P(A' \cap B')$
 - (b) $P(A' \cup B')$

(8 × 2 = 16 Marks)

SECTION – C

Answer any six questions. Each carries 4 marks

23. Coefficient of correlation between two variables X and Y is 0.32. Their covariance is 7.86. The variance of X is 10. Find the standard deviation of Y.
24. What do you mean by consistency of given data? Examine the consistency of the following data:

$N = 1,000$, $(A) = 600$, $(B) = 500$, $(AB) = 50$, the symbols having their usual meaning.

25. Given the sum of the products of prices and quantities for the current year 1 and base year 0 for 5 items as:

$$\sum p_1 q_0 = 782, \sum p_0 q_1 = 1008, \sum p_1 q_1 = 1329.$$

On the basis of the given information, show that the data satisfies time reversal test.

26. Give the advantages and limitations of chain base indices.
27. Define probability mass function (pmf) and probability density function (pdf) of a random variable. State their properties.
28. Find the probability that in a family of 4 children there will be (i) at least one boy one girl, (ii) at least one boy. Assume that the probability of a male birth is $1/2$.
29. What are the tests to be satisfied by a good index number? How far do the simple and weighted index number satisfy these tests?
30. A problem is given to three students. Their chances of solving the problem are respectively $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$. What is the probability that the problem will be solved?
31. The following table shows the result of immunization against Cholera.

	Not attacked	Attacked
Immunized	431	5
Not immunized	291	9

Examine the effect of immunization in controlling susceptibility to cholera.

(6 × 4 = 24 Marks)

SECTION – D

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

32. Calculate the correlation coefficient for the following heights (in inches) of father(X) and their sons (Y):

X: 65 66 67 67 68 69 70 72

Y: 67 68 65 68 72 72 69 71

33. In a partially destroyed laboratory record of an analysis of correlation data, the following results only are legible:

Variance of $X = 9$.

Regression equations: $8X - 10Y + 66 = 0$, $40X - 18Y = 214$

What are

- (a) the mean values of X and Y ,
 - (b) the correlation coefficient between X and Y , and
 - (c) the standard deviation of Y ?
34. (a) Explain the methods of constructing index numbers.
- (b) Compute a price index for the following by (a) simple aggregate method and average of price relatives method by using both arithmetic mean and geometric mean.

Commodity:	A	B	C	D	E	F
Price in 1971 (Rs):	20	30	10	25	40	50
Price in 1976 (Rs):	25	30	15	35	45	55

35. (a) Define a random variable. Explain discrete and continuous random variables.
- (b) The following is the probability mass function of a discrete random variable X .

x	-2	-1	0	1	2	3
$p(x)$	0.1	k	0.2	$2k$	0.3	k

- (i) Find the value of k
- (ii) $P(X=1 \text{ or } X=2)$, $P(|X| < 1)$, $P(-2 < X < 2)$.

(2 × 15 = 30 Marks)