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K – 2331

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

(2019 Admission Regular)

Time : 3 Hours

Max. Marks : 80

Use of Calculator is permitted.

SECTION – A

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

1. What is the purpose of a scatter diagram?
2. What is the range of correlation coefficient?
3. Define regression analysis.
4. When do you say the two regression lines are perpendicular?
5. What do you mean by illusory association of attributes?
6. Give the relation between the Yule's coefficients of association and colligation.
7. Index numbers are called economic barometers, why?

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8. Define splicing of indices.
9. When do you say two events are mutually exclusive?
10. Give the frequency/statistical definition of probability.

(10 × 1 = 10 Marks)

SECTION – B

Answer any eight questions. Each question carries 2 marks.

11. What are the importance and uses of correlation study?
12. Define the Karl Pearson's coefficient of correlation. What does it indicate when the value of this coefficient is zero?
13. When do you go for computing rank correlation coefficient?
14. What are the underlying assumptions of Karl Pearson's coefficient of correlation?
15. Why there are two regression lines? When do they coincide?
16. What are regression coefficients?
17. What are the different types of association that possibly occur between attributes?
18. Define the coefficient of colligation.
19. What do you mean by weighted index numbers?
20. What are the limitations of un-weighted indices?
21. Which is the ideal index number? Why it is called ideal?
22. What are quantity or volume index numbers?
23. Define a random experiment with an example.

24. What are the properties of a probability mass function?
25. Given the mean and variance of a Binomial random variable are 4 and 9 respectively. Do you agree? Establish your claim.
26. What is the area under a Standard Normal curve from the ordinates - 1 to +2?

(8 × 2 = 16 Marks)

SECTION – C

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

27. Explain the different types of correlation.
28. What are the merits and demerits of rank correlation coefficient?
29. Given the two regression lines of Y on X and that of X on Y as $Y = 2X$ and $6X - Y = 4$ respectively.

Find (a) the correlation coefficient and (b) the means of X and Y .

30. What are the properties of the linear regression coefficients?
31. Establish the Yule's coefficient of association and write it's properties.
32. Comment on the nature of association between the two attributes A and B , given
 - (a) $N = 1000, (A) = 450, (B) = 600, (AB) = 340$
 - (b) $N = 1000, (A) = 500, (B) = 400, (AB) = 200$.
33. Explain the time reversal test and factor reversal test.

34. Give the formula for converting the chain base index into fixed base index. What are the advantages and limitations of chain base indices?
35. What purpose is served by consumer price index number (Cost of Living Index Number).
36. Four coins are tossed simultaneously. What is the probability of getting (1) 2 heads and 2 tails and (2) at least 2 heads?
37. If 3% of fans manufactured by a company are defective, find the probability that in a sample of 100 fans, exactly 5 fans are defective. (Given $e^{-3} = 0.0498$).
38. Write the important properties of the Normal distribution.

(6 × 4 = 24 Marks)

SECTION – D

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

39. Find the correlation coefficient between X and Y from the following data.

$x:$ 2 3 4 5 6 7 8

$y:$ 4 5 6 8 9 7 10

40. To study the effect of rain on yield of wheat, the following results were obtained. Estimate the yield when the rainfall is 80 inches.

	Mean	S.D.
Yield in pounds:	800	12
Rainfall in inches:	50	2

The correlation coefficient $r = 0.80$.

41. In a sample of 1000 men, 400 are from high income group and rest from low income group. The number of extravagant in these groups are respectively 50 and 200. Check whether there is association between the attributes high income and extravagance by

(a) Yule's coefficient of association and

(b) Coefficient of colligation.

42. The following are the prices and quantities of 3 commodities in the years 2015 and 2016. Calculate the price index number for the year 2016 by taking 2015 as the base year using:

(a) Laspeyre's method,

(b) Paasche's method and

(c) Fisher's index.

	2015		2016	
Commodity	Price	Quantity	Price	Quantity
A	4	50	10	40
B	3	10	9	2
C	2	5	4	2

43. (a) State and prove the addition theorem of probability of two events.

(b) Find the probability of drawing an ace or spade from a pack of 52 cards.

44. (a) Consider the following probability distribution.

$$X=x: \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7$$

$$P(X=x): \quad k \quad k \quad 2k \quad k \quad 4k \quad 6k \quad k \quad 7k$$

Find :

(i) k ,

(ii) $P(X > 5)$

(iii) $P(2.5 < X < 5.5)$ and

(iv) $P(X < 2)$.

(b) In a distribution which is exactly Normal 7% of the items are under 35 and 89% are under 63. What are the mean and S.D?

(2 × 15 = 30 Marks)