

BACHELOR OF SCIENCE (CBCS-2018 COURSE)
F. Y. B. Sc. Sem-II : WINTER :- 2021
SUBJECT: STATISTICS : DESCRIPTIVE STATISTICS-II

Day : Thursday
Date 3/2/2022

W-18337-2021

Time : 02:00 PM-05:00 PM
Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.

Q.1 Attempt **ANY TWO** of the following: **[12]**

- a) Define the coefficient of correlation and state its important properties.
- b) For the two regression lines $X - 9Y + 16 = 0$ and $4X - Y - 6 = 0$. Find means of X and Y and correlation coefficient between X and Y. Also find σ_y if $\sigma_x = 6$.
- c) Compute the Spearman's rank correlation coefficient between X and Y.

X	81	72	60	33	29	11	56	42	40	37
Y	75	42	56	15	30	20	60	80	85	25

Q.2 Attempt **ANY TWO** of the following: **[12]**

- a) State the properties of regression coefficients.
- b) Given : $n = 20$, $\Sigma x = 80$, $\Sigma y = 40$, $\Sigma x^2 = 1680$, $\Sigma y^2 = 320$, $\Sigma xy = 480$, find correlation coefficient between X and Y. Also find that between $\frac{3X}{2}$ and $\frac{-5Y}{6}$.
- c) For bivariate data we have $\bar{X} = 50$ and $\bar{Y} = 30$, $b_{yx} = \frac{4}{3}$ and $b_{xy} = \frac{1}{3}$, find:
 - i) Correlation coefficient between X and Y
 - ii) Estimate y for $x = 60$
 - iii) Estimate x for $y = 35$.

Q.3 Attempt **ANY TWO** of the following: **[12]**

- a) Calculate the Fisher's price index number for the following data:

Commodity	p_0	q_0	p_1	q_1
A	4	5	12	3
B	4	4	6	4
C	2	3	3	5

- b) Explain the procedure of fitting of second degree curve.
- c) Suppose X, Y and Z are uncorrelated variables having same arithmetic mean and variances. Find correlation coefficient between $X + Y$ and $Y - Z$.

P.T.O.

Q.4 Attempt **ANY THREE** of the following: **[12]**

- a) If X and Y are uncorrelated, show that
$$\text{Var}(X - Y) = \text{Var}(X + Y)$$
- b) State the uses of index numbers.
- c) Spearman's rank correlation coefficient between X and Y is 0.5. If sum of the squares of the difference between ranks is 42, find the number of pairs. Assume that no rank is repeated.
- d) Given that :
$$n = 9, \sum(x - \bar{x})(y - \bar{y}) = 108, \sum(x - \bar{x})^2 = 81 \text{ and } \sum(y - \bar{y})^2 = 900,$$

Find correlation coefficient between X and Y.

Q.5 Attempt **ANY FOUR** of the following: **[12]**

- a) State the merits of scatter diagram.
- b) State the two situations where the variables are uncorrelated.
- c) Given $\text{Cov}(X, Y) = 20, \sigma_x = \sigma_y = 5$, find two regression coefficients.
- d) Explain the terms base year and current year related to Index number.
- e) Prove that $r = \sqrt{b_{yx} \times b_{xy}}$.
- f) If $\text{Cov}(X, Y) = 20, \text{Var}(X) = 9$ and $\text{Var}(Y) = 16$ then find $\text{Var}(2X + Y)$.

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