

F.Y.B.SC. SEM – II (CBCS - 2016 COURSE) : SUMMER - 2018

SUBJECT : STATISTICS : DESCRIPTIVE STATISTICS – II

Day : Friday  
Date : 20/04/2018

S-2018-0639

Time : 03.00 PM TO 06.00 PM  
Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of statistical tables and **CALCULATOR** is allowed.
- 4) Draw neat and labeled diagrams **WHEREVER** necessary.

Q.1 A) Choose correct alternative for: [06]

- i) If  $\text{corr}(X, Y) = 0.5$ , then  $\text{corr}(X - 10, 10 - Y)$  is \_\_\_\_\_.  
a) 0.5      b) 0      c) -0.5      d) 1
- ii) If  $\text{cov}(X, Y) = 70$ , then  $\text{cov}(X - 20, 3Y)$  is \_\_\_\_\_.  
a) 210      b) 70      c) 0      d) 50
- iii) If  $b_{xy} = -1.5$ ,  $b_{yx} = -0.2$ , then  $r$  is \_\_\_\_\_.  
a) -0.5477      b) 0.5477      c) 0      d) none of these
- iv) The regression coefficient  $b_{yx}$  is given by:  
a)  $r \cdot \frac{\sigma_x}{\sigma_y}$       b)  $r \frac{\sigma_y}{\sigma_x}$       c)  $\frac{\sum xy - n\bar{x}\bar{y}}{\sigma_x \cdot \sigma_y}$       d) none of these
- v) Laspeyre's price index number uses weight as \_\_\_\_\_.  
a) Base year quantity      c) Arithmetic mean of quantities  
b) Current year quantity      d) None of the above
- vi) If  $\sum p_1q_1 = 860$ ,  $\sum p_0q_1 = 830$ , then Paasche's price index number is \_\_\_\_\_.  
a) 107.1429      b) 103.6145      c) 105.3639      d) none of these

B) State whether the following statements are true or false: [06]

- i) Index number of base year is 100.
- ii) Price relative is the difference between current year price and base year price.
- iii) The regression coefficients are independent of change of origin.
- iv) It is possible to have  $b_{yx} = 2$ ,  $b_{xy} = 1.3$ .
- v) Correlation coefficient is unit less quantity.
- vi) If X and Y are correlated then they are dependent.

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

- a) The marks obtained by 10 students in statistics and mathematics are:

|             |   |   |   |   |   |   |   |    |   |    |
|-------------|---|---|---|---|---|---|---|----|---|----|
| Mathematics | 1 | 2 | 3 | 5 | 5 | 5 | 7 | 8  | 9 | 10 |
| Statistics  | 2 | 4 | 2 | 5 | 2 | 9 | 7 | 10 | 6 | 8  |

Find rank correlation coefficient.

P.T.O.

- b) Find  $n$  if  $r = 0.5$ ,  $\sigma_y = 8$ ,  $\sum(x_i - \bar{x})^2 = 90$  and  $\sum(x_i - \bar{x})(y_i - \bar{y}) = 120$ .
- c) Given the regression lines  $X - 4Y = 5$  and  $X - 16Y + 64 = 0$ . Find  $\bar{X}$ ,  $\bar{Y}$  and  $\text{corr}(X, Y)$ .
- d) State the uses of index number.

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

- a) If  $X$  and  $Y$  are uncorrelated, show that  $\text{Var}(X + Y) = \text{Var}(X - Y)$ .
- b) Explain the concept of tie in ranking.
- c) For a bivariate data we have  $\bar{X} = 53$ ,  $\bar{Y} = 28$ ,  $b_{yx} = -1.5$ ,  $b_{xy} = -0.2$ . Estimate  $Y$  for  $X = 60$ .
- d) If  $\sigma_x = \sigma_y$ ,  $\text{corr}(X, Y) = r$ , the show that  $\text{corr}(X, X + Y) = \sqrt{\frac{1+r}{2}}$ .
- e) Explain the term covariance.

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

- a) Describe the procedure of fitting of second degree curve.
- b) Calculate Fisher's price index number for the following data:

| Commodity | $p_0$ | $q_0$ | $p_1$ | $q_1$ |
|-----------|-------|-------|-------|-------|
| A         | 5     | 8     | 3     | 4     |
| B         | 2     | 6     | 6     | 2     |
| C         | 1     | 5     | 2     | 3     |

- c) Show that Spearman's rank correlation coefficient lies between  $-1$  and  $1$ .

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

- a) State the properties of regression coefficients.
- b) Obtain the regression line of  $Y$  on  $X$  for the following data:

|   |   |   |   |    |
|---|---|---|---|----|
| X | 2 | 4 | 6 | 8  |
| Y | 2 | 5 | 8 | 11 |

- c) If  $X$  and  $Y$  are uncorrelated variables and  $\sigma_x^2 = k$ ,  $\sigma_y^2 = 2$ , find  $k$  such that  $\text{Var}(3X - Y) = 25$ . Hence find  $\text{Var}(X + Y)$ .

\* \* \* \*