F.Y.B.SC. SEM – II (CBCS - 2016 COURSE) : WINTER - 2017
SUBJECT : STATISTICS : DESCRIPTIVE STATISTICS – II

Day : **Wednesday** Time : **03.00 PM TO 06.00 PM**
Date : **01/11/2017** Max. Marks : 60

W-2017-0561

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 corr (X, Y) = 0 then we conclude that
a) $\sigma_x = \sigma_y$ **c)** there is no relationship between X and Y
b) $\overline{X} = \overline{Y}$ **d)** there is no linear relationship between X and Y

ii) If X = constant then corr (X, Y) is _____.
a) 1 **b)** −1 **c)** 0 **d)** indeterminate

iii) If $b_{yx} = b_{xy}$ then _____.
a) $\sigma_x = \sigma_y$ **b)** $r = -1$ **c)** $r = 1$ **d)** $r = 0$

iv) If the correlation coefficient $r = \pm 1$ then the regression lines _____.
a) are parallel **c)** are perpendicular to each other
b) are coincident **d)** both a and b

v) Index numbers measure the average _____.
a) Relative changes **c)** Percentage increase
b) Absolute changes **d)** Proportionate changes

vi) Laspeyre's price index number uses weight as _____.
a) Current year quantity
b) Base year quantity
c) Average of base and current year quantity
d) Geometric mean of base and current year quantity

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

i) Correlation coefficient is unitless quantity.
ii) Rank correlation coefficient lies between 0 to 1.
iii) The algebraic signs of b_{xy}, b_{yx} and r are same.
iv) In regression analysis, it is possible to have $b_{xy} = 1.3$ and $b_{yx} = 2$.
v) Index number lies between 0 to 100.
vi) Fisher's index number is the geometric mean of Laspeyre's and Paasche's index number.

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

a) With usual notations, show that Karl Pearson's correlation coefficient lies between −1 to 1.

b) Explain the procedure for fitting of exponential curve $Y = a.\ b^x$.

c) If $\sigma_x = \sigma_y$, corr $(X, Y) = r$ then show that $corr\ (X,\ X+Y) = \sqrt{\frac{1+r}{2}}$.

d) Compute price index numbers for the year 2012 with base year 2011 using weighted arithmetic mean of price relatives.

Commodity	A	B	C	D
Price in 2011	10	8	25	16
Price in 2012	12	9	30	28
Weight	30	20	25	25

P.T.O.

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

a) Define: **i)** Unweighted aggregative type index number
ii) Simple average of price relatives

b) Explain the terms: **i)** Positive correlation **ii)** Negative correlation.

c) Find value of X if for the following data Laspeyre's price index number is 114.4.

Commodity	Price		Base year quantity
	Base year	Current year	
A	36	40	100
B	80	90	12
C	45	41	X
D	5	6	1100

d) If correlation coefficient between X and Y is 0.8, find that between:

i) $\frac{10-X}{2}, \frac{10-Y}{2}$ **ii)** $X-5, Y-5$ **iii)** $X, -Y$.

e) For a bivariate data we have $\overline{X} = 53$, $\overline{Y} = 28$, $b_{yx} = -1.5$, $b_{xy} = -0.2$. Find:

i) Correlation coefficient between X and Y
ii) Estimate Y when X = 60.

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

a) Derive the expression for regression lines of Y on X, using the model $Y = a + bX$.

b) The scores obtained by 11 candidates in drawing (X) and in music (Y) are given below:

Candidate	A	B	C	D	E	F	G	H	I	J	K
X	24	29	19	14	30	19	27	30	20	28	11
Y	37	35	16	26	23	27	19	20	16	11	21

Compute Spearman's rank correlation coefficient between X and Y and interpret the result.

c) Compute Fisher's price index number for the following data and interpret the result:

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
A	300	50	560	56
B	200	100	240	120
C	240	60	360	60
D	300	30	288	24
E	320	40	432	36

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

a) Explain the problems in construction of index numbers briefly.

b) Fit a second degree parabola to the following series of observations, considering year as the independent variable.

Year	2008	2009	2010	2011	2012
Index of Jute export prices	185	169	191	203	275

Also find estimate for the year 2016.

c) Suppose X, Y and Z are uncorrelated variables having same arithemetic means and variances. Find: **i)** Corr $(X, X+Y)$ **ii)** Corr $\left(X, \frac{X+Y}{2}\right)$.

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