DF-3029
Second Year B. Sc. (Sem. III) Examination
March / April - 2015
Statistics : Paper - 301
(Correlation & Regression & Association of Attributes)

Time : 2 Hours
[Total Marks : 50]

Instructions:

1. Fill up strictly the details of signs on your answer book.
2. There are 25 questions and all are compulsory.
3. Read the question carefully before selecting the correct option.
4. Statistical and logarithmic tables will be supplied on request.
5. Use of non-programmable scientific calculator is allowed.

SECTION - A : Q. 1 to 10 Multiple choice questions : (1 mark)
SECTION - B : Q. 11 to 20 Multiple Choice Questions : (2 marks)
SECTION - C : Q. 21 to 25 Multiple choice questions : (4 mark)

O.M.R. Sheet आंशिक अर्थात अवस्थीतील चार झाडांमध्ये आपेक्ष
O.M.R. Sheet-चे पावेलं घोड्यांचे हे.
Important instructions to fill up O.M.R. Sheet are
given on back side of the provided O.M.R. Sheet.
1 The value of Yule's coefficient of association is between _______ and _______.

(A) None of these
(B) −1 and 1
(C) 0
(D) $\frac{1}{2}$

2 If $\frac{(AB)}{(B)} > \frac{(A\beta)}{\beta}$ then what type of association between $A$ and $B$ is?

(A) None of these
(B) Positive
(C) Negative
(D) Non associated

3 What is the value of $r$ when the two variables are perfectly negatively correlated?

(A) $\frac{1}{2}$
(B) −1
(C) 0
(D) +1
4. If the rank correlation coefficient is zero, then what is the value of the correlation coefficient?

(A) \( \frac{1}{2} \)

(B) -1

(C) 0

(D) +1

5. All the points of the scatter diagram are on one line then what kind of correlation?

(A) None of these

(B) Not perfect

(C) Perfect

(D) Not associated

6. If \( r_{xy} = \frac{1}{2}, v(x) = 2, v(y) = 9 \) then, \( \text{cov}(x, y) = \) _______

If \( r_{xy} = \frac{1}{2}, v(x) = 2, v(y) = 9 \) then, \( \text{cov}(x, y) = \) ____________.

(A) 2

(B) 3

(C) -3

(D) -2
7. If $x$ and $y$ are positively correlated with $r = 0.5$, then find the correlation coefficient between $4x$ and $y$.
(A) 0.4
(B) -0.5
(C) -0.4
(D) 0.5

8. If $8x - 10y + 66 = 0$ is the regression line of $x$ on $y$, then find $\bar{x}$ when $\bar{y} = 10$.
(A) 66
(B) 8
(C) 10
(D) 13

9. If $b_{yx} = 2.5$ and $b_{xy} = 0.4$, then what is the value of $r$?
(A) $\frac{1}{2}$
(B) 0
(C) 1
(D) -1

10. If $(AB) < \frac{(A)(B)}{N}$, then what type of association between two attributes?
(A) None of these
(B) Positive
(C) Negative
(D) Independent
11 The values of two variables are given as $x = 25$, $r = 0.6$ and $v(x) = 36$. If the covariance of two variables is $25$, $r = 0.6$ and $v(x) = 36$, then find the standard deviation of $y$.
(A) 7.94
(B) 4.94
(C) 5.94
(D) 6.94

12 If $\bar{x} = 25$, $\bar{y} = 20$, $\sigma_x = 4$, $\sigma_y = 5$ and $r = 0.8$ then find the equation of the regression line $y = 30$, and $y$ in terms of $x$ and $y$.
If $\bar{x} = 25$, $\bar{y} = 20$, $\sigma_x = 4$, $\sigma_y = 5$ and $r = 0.8$ if $x = 30$, then find the value of $y$.
(A) 30
(B) 15
(C) 20
(D) 25

13 If the regression equations are $4y - 5x = 0$ and $5y - x = 6$ then find the mean of $x$ and $y$.
If regression equations are $4y - 5x = 0$ and $5y - x = 6$ then the mean of $x$ and $y$ are _______ and _______ respectively.
(A) 12, 10
(B) 12, 15
(C) 15, 12
(D) 15, 10

14 If $r_{xy} = 0.2$ then find the value of acute angle $\theta$ between two regression lines.
If $r_{xy} = 0.2$ then find the value of acute angle $\theta$ of two regression lines.
(A) 66.60
(B) 66.85
(C) 66.15
(D) 66.70

15 If $(AB) = 200$, $(A\beta) = 40$, $(\alpha B) = 700$, $(\alpha \beta) = 160$ then find $N$.
If $(AB) = 200$, $(A\beta) = 40$, $(\alpha B) = 700$, $(\alpha \beta) = 160$ then find $N$.
(A) 1200
(B) 900
(C) 1000
(D) 1100

16 Matrix $\begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$ is multiplied by the matrix $\begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$.
For the data $\begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$ what is the coefficient of Yule's attribute?
(A) 0.042
(B) -0.024
(C) 0.024
(D) -0.042

DF-3029_B] 5 [Contd...
17 Let \( x \) and \( y \) be independent random variables and \( (3x + 4y) \) and \((x + ky)\) be two such random variables. If \( x \) and \( y \) are standard independent variables and if correlation between \((3x + 4y)\) and \((x + ky)\) is zero then what is the value of \( k \)?

(A) \( \frac{3}{4} \)
(B) \( \frac{4}{3} \)
(C) \( \frac{3}{4} \)
(D) \( \frac{4}{3} \)

18 Let \( x \) and \( y \) be two random variables with \( \mu_x = -60 \), \( \sigma_x = 8 \) and \( \mu_y = 10 \), \( \sigma_y = 12 \) respectively. If the correlation coefficient \( r \) is \( \frac{3}{4} \), then what is the value of \( r \)?

(A) \( -0.60 \)
(B) 0.80
(C) 0.75
(D) 0.60

19 Let \( \sum d_i^2 = 330 \) and the rank correlation coefficient is \( -0.5 \). If \( n = \) the number of pairs, then find the number of pairs \( n \).

(A) 12
(B) 10
(C) 9
(D) 11

20 Let \( r_{xy} = 0.25 \), \( \nu(x) = 4 \), \( \nu(y) = 9 \). If \( \nu(x - 2y) \) then what is \( \nu(x - 2y) \)?

(A) 42
(B) 34
(C) 43
(D) 24
21 एक संग्रहालय में निम्न रूप से संबंधित संख्याओं से समानांतर 3x + 2y = 26 और 6x + y = 31
लिखित को तो \( \bar{x} = \) ________, \( \bar{y} = \) ________ और \( r = \) ________.

If for two random variables regression equations are \( 3x + 2y = 26 \) and \( 6x + y = 31 \) then \( \bar{x} = \) ________, \( \bar{y} = \) ________ and \( r = \) ________.
(A) None of these
(B) 7, 4 and 0.5
(C) 4, 7 and 0.5
(D) 5, 7 and 0.5

22 \( Y \) ने \( X \) पर नीचे तथा \( X \) नी \( Y \) पर नीचे रेंजार्नों अनुक्रमबद्ध \( y = x \) और \( 4x - y = 3 \) छो सेवेमें \( \nu(x) = 4 \) को परीक्षा तो \( r = \) ________ और \( \sigma_y = \) ________.

If \( Y \) on \( X \) and \( X \) on \( Y \) are two lines \( y = x \) and \( 4x - y = 3 \) and \( \nu(x) = 4 \)
then \( r = \) ________ and \( \sigma_y = \) ________.
(A) 0.5 and 3
(B) 3 and 0.25
(C) 4 and 0.25
(D) 0.5 and 4

23 नीचे पहली भागी बाये ने \( AB \) एवं बाये ने \( B \) तथा \( N = 1200 \) से पहले करें.

(A) = 800, (AB) = 250, (B) = 500, N = 1200

For the following data find Yule's coefficient of association between two attributes.

(A) = 800, (AB) = 250, (B) = 500, N = 1200

(A) -0.57

(B) -0.75

(C) 0.75

(D) 0.57

DF-3029_B] 7 [Contd...
For random variables $x$ and $y$  $\mu(x) = \mu(y) = \sigma^2$ and $\text{cov}(x, y) = \frac{\sigma^2}{2}$ then find the correlation $r$ between $2x+3$ and $2y-3$.

(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) $-\frac{1}{3}$

(D) $\frac{1}{2}$

Three variables $x_1$, $x_2$, $x_3$ have same variance $\sigma^2$ and correlation coefficient between them is $r$, if $\bar{x} = \frac{x_1 + x_2 + x_3}{3}$ then $\mu(\bar{x}) = \ldots$.

(A) None of these

(B) $\frac{\sigma^2}{3}(1+2r)$

(C) $\frac{\sigma^2}{2}(1+3r)$

(D) $\frac{\sigma^2}{3}(1+3r)$