PART B

Workbook [कार्य-पुस्तिका]

[Competency-based Learning through **Objective Questions**]

SET-1

Fill in the Blanks

Choose appropriate word/term and fill in the blank:

1. Correlation aims at _____ between two variables.
(forecasting relationship/establishing relationship)
2. The correlation between eating sweets and becoming diabetic is _____.
(positive/negative)
3. For finding the degree of agreement between points allotted by two judges in a debate competition, we use _____. (Spearman's Rank Correlation/Scattered Diagram)
4. A scattered diagram _____. (must be linear/is a graph of X and Y values)
5. The unit of correlation coefficient between height in feet and weight in kg is _____.
(percentage/non-existent)
6. If sum of the product of deviations of x and y series from their actual mean is zero, the coefficient of correlation shall be _____. [*NCERT*]
7. The correlation coefficient is _____ number. (–1/0)
8. _____ is not affected by the extreme values. (a scale free/not a scale free)
9. A low value of r indicates _____ relationship between the two variables under discussion. (Scattered Diagram/Karl Pearson's Coefficient of Correlation)
10. Zero correlation implies that there is _____ relationship between the two variables. (strong/weak)
(linear/non-linear)

SET-2

Multiple Choice

Choose the correct option:

1. **Correlation means _____ .**
   (*a*) causation
   (*b*) indefinite connection
   (*c*) change in one variable accompanied by change in the other
   (*d*) none of these
2. **Scatter diagram is considered for measuring:**
   (*a*) absolute and exact value of r
   (*b*) linear relationship between variables
   (*c*) curvilinear relationship
   (*d*) both (*a*) and (*b*)
3. **The correlation between beauty and shoe size is:**
   (*a*) zero
   (*b*) positive
   (*c*) negative
   (*d*) none of these
4. **What is the range of Karl Pearson's coefficient of correlation?**
   (*a*) No limits
   (*b*) –1 and 1
   (*c*) 0 and 1, including the limits
   (*d*) –1 and 1 including the limits

5. **Of the following three measures which can measure any type of relationship?**
(*a*) Karl Pearson's coefficient of correlation (*b*) Spearman's rank correlation
(*c*) Scatter diagram (*d*) None of these [NCERT]

6. **The sum of difference of ranks is:**
(*a*) 1 (*b*) –1
(*a*) 0 (*d*) none of these

7. **If coefficient of correlation lies between 0 and 0.25, the degree of correlation is rated _____.**
(*a*) high (*b*) moderate
(*c*) low (*d*) none of these

8. **_____ method can handle only limited number of observations.**
(*a*) Rank correlation (*b*) Karl Pearson's coefficient of correlation
(*c*) Scattered diagram (*d*) None of these

9. **If high values of one series tend to low the values of the other series, they are said to be:**
(*a*) negatively correlated (*b*) positively correlated
(*c*) both (*a*) and (*b*) (*d*) none of these

10. **If there is perfect agreement between marks in English and Economics, then the value of rank correlation coefficient will be _____.**
(*a*) +1 (b) –1
(*c*) 0 (*d*) none of these

11. **Identify the incorrect statement:**
(*a*) Coefficient of correlation is independent of change in origin
(*b*) There exists negative correlation between height and weight
(*c*) Coefficient of correlation is independent of change in scale
(*d*) All of these

12. **If r = 1, all points in a scatter diagram would lie:**
(*a*) on a straight line directed from upper left to lower right.
(*b*) on a straight line
(*c*) on a straight line directed from lower left to upper right
(*d*) both (*a*) and (*b*)

13. **Which of the following correlation coefficients suggest the lowest degree of correlation?**
(*a*) 0.89 (*b*) –0.50
(*c*) –0.25 (*d*) 0.19

14. **If precisely measured data are available the simple correlation coefficient is:** [NCERT]
(*a*) more accurate than rank correlation coefficient
(*b*) less accurate than rank correlation coefficient
(*c*) as accurate as the rank correlation coefficient
(*d*) none of these

15. **Coefficient of Rank Difference =**
(*a*) $r_k = 1 + \frac{6\Sigma D^2}{N^3 + N}$ (*b*) $r_k = 1 - \frac{6\Sigma D^2}{N^3 - N}$
(*c*) $r_k = 1 + \frac{6\Sigma D^2}{N^2 + N}$ (*d*) $r_k = 1 \times \frac{6\Sigma D^2}{N^3 + N}$

SET-3

True or False

State whether the following statements are True or False:

1. A coefficient of correlation near +1 indicates tendency for the larger values of one variable to be associated with the larger values of the other. (True/False)
2. A straight line parallel to X-axis indicates high degree of correlation between the two given variables. (True/False)
3. It is convenient to find Spearman's rank correlation if number of observations are more. (True/False)
4. The study of correlation shows the direction and degree of relationship between the variables. (True/False)
5. There is a positive correlation between healthy eating and resistance to diseases. (True/False)
6. Charles Edward Spearman formulated the Spearman's rank correlation. (True/False)
7. Spearman's rank correlation method is difficult than Pearson's method of correlation. (True/False)
8. Linear correlation occurs when there is proportional change between variables. (True/False)
9. If $r_{XY} = 0$, the variables X and Y are not linearly related. (True/False)
10. Simple correlation coefficient can measure any type of relationship. (True/False)

SET-4

True-False Alternatives

In the following questions (1-5), two statements are given. Read the statements carefully and choose the correct alternative among those given below:

Alternatives:

(a) Both the statements are true

(b) Both the statements are false

(c) Statement 1 is true and Statement 2 is false

(d) Statement 2 is true and Statement 1 is false

1. Statement 1 : If r = 0 then it means change in one variable has no effect on the other.
   Statement 2 : r < 0 but >1.
2. Statement 1 : A scattered diagram gives only an approximate idea of the relationship between two variables.
   Statement 2 : It is not a quantitative measure of the relationship between the variables.
3. Statement 1 : Karl Pearson's coefficient of correlation is generally written as 'r'.
   Statement 2 : Value of coefficient of correlation may vary between +1 and –1.
4. Statement 1 : Charles Edward Spearman developed a formula to calculate coefficient of correlation of qualitative variables.
   Statement 2 : It is popularly known as 'Spearman's Rank Difference Formula or Method'.
5. Statement 1 : The study of correlation shows only the degree of relation between the variables.
   Statement 2 : Correlation is a significant statistical tool as it helps in formation of laws and concepts in economic theory.

SET-5

Choose the Correct Pair of Statements/Identify the Correct Sequence of Alternatives

1. **From the set of statements given in Column I and Column II, choose the correct pair of statements**

Column I	Column II
A. Karl Pearson's coefficient of correlation	(*i*) helps calculate coefficient of correlation qualitative variables
B. Spearman's Rank correlation	(*ii*) used in case of group frequency distribution
C. Scattered diagram	(*iii*) measures the precise extent of correlation
D. Rank method	(*iv*) Spearman's Rank correlation

Alternatives:

(*a*) A—(*i*) (*b*) B—(*ii*)

(*c*) C—(*iii*) (*d*) D—(*iv*)

2. **Identify the correct sequence of alternatives given in Column II by matching them with respective items in Column I:**

Column I	Column II
A. When the two variables do not change in any constant proportion	(*i*) Partial correlation
B. The study of relationship between two variables only	(*ii*) Non-linear correlation
C. When relationship between three or more variables is studied	(*iii*) Multiple correlation
D. When relationship between two variables is studied, keeping other variables as constant	(*iv*) Simple correlation

Alternatives:

(*a*) A—(*iv*), B—(*i*), C—(*ii*), D—(*iii*) (*b*) A—(*ii*), B—(*iv*), C—(*iii*), D—(*i*)

(*c*) A—(*iv*), B—(*iii*), C—(*i*), D—(*ii*) (*d*) A—(*iii*), B—(*i*), C—(*iv*), D—(*ii*)

SET-6

Assertion and Reasoning

In the following questions (1-5), a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct alternative among those given below:

Alternatives:

(*a*) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

(*b*) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)

(*c*) Assertion (A) is true but Reason (R) is false

(*d*) Assertion (A) is false but Reason (R) is true

1. **Assertion (A) :** The coefficient of correlation for price and supply is +1.
   Reason (R) : Line of Best Fit is the one that passes through the scattered points such that it represents most of these points.
2. **Assertion (A) :** Units of measurement are not parts of correlation.
   Reason (R) : "r" is a pure number and hence facilitates easy establishment of relationships across variables.

3. Assertion (A) : Karl Pearson's coefficient of correlation lies between +1 and -1.
Reason (R) : Karl Pearson's coefficient of correlation is based on measures like mean and standard deviation.

4. Assertion (A): Any constant added or subtracted to all the observations does not affect the value of coefficient of correlation.
Reason (R) : The coefficient of correlation is affected by change in origin.

5. Assertion (A) : Studying the relationship between productivity of rice and factors like rainfall, fertilizers, etc., will fall under the domain of simple correlation.
Reason (R) : Simple correlation implies the study of relationship between two variables only.

ANSWERS

SET-1

1. establishing relationship
2. positive
3. Spearman's Rank Correlation
4. is a graph of X and Y values
5. non-existent
6. 0
7. a scale free
8. Scattered Diagram
9. weak
10. non-linear

SET-2

1. (*c*) 2. (*b*) 3. (*a*) 4. (*d*) 5. (*c*) 6. (*c*) 7. (*c*) 8. (*a*) 9. (*a*) 10. (*a*)
11. (*b*) 12. (*c*) 13. (*d*) 14. (*a*) 15. (*b*)

SET-3

1. True 2. False 3. False 4. True 5. True 6. True 7. False 8. True 9. True 10. False

SET-4

1. (*c*) 2. (*a*) 3. (*a*) 4. (*a*) 5. (*d*)

SET-5

1. (*d*) 2. (*b*)

SET-6

1. (*b*) 2. (*a*) 3. (*b*) 4. (*c*) 5. (*d*)