2025

STATISTICS

Full Marks : 100

Pass Marks : 33

Time : Three hours

For Question Nos. 1 to 12, choose the correct answer and rewrite.

1. If no. of ways in which the letter of the word BANANA can be arranged is – 1

(A) 60 (B) 80

(C) 100 (D) 120

2. The domain of the function $\sqrt{(4-x)(x+2)}$ is – 1

(A) $-2 \leq x < 4$ (B) $-2 \leq x \leq 4$

(C) $-2 < x < 4$ (D) $-2 < x \leq 4$

3. The number of lines can be drawn by joining the vertices of a pentagon is – 1

(A) 6 (B) 8

(C) 10 (D) 12

4. The harmonic mean of two number 4 and 8 is – 1

(A) $\frac{3}{6}$ (B) $\frac{16}{3}$

(C) $\frac{12}{3}$ (D) $\frac{3}{12}$

5. The 1st and 3rd quartiles of a given distribution are 18 and 34. The quartile deviation is – 1

(A) 26 (B) 16

(C) 8 (D) 12

6 If $u = \frac{x}{h}$ and $v = \frac{y}{k}$ where h and k are the change of scales, then the regression coefficients bvu and byx is related – 1

(A) $h^2bvu = byx$ (B) $k^2bvu = byx$

(C) $kbyx = hbvu$ (D) $hbyx = kbvu$

7. If x and y are two independent variables, then the coefficient of correlation is – 1

(A) 0 (B) 1

(C) –1 (D) 0.5

8. The index numbers for the years 2015 and 2016 are 110 and 132. The Link Relative for 2016 is – 1

(A) 110 (B) 120

(C) 132 (D) 121

9. The aggregate expenditures for the current and base years are 130 and 120. The value index number is – 1

(A) 92.3 (B) 106.3

(C) 107.3 (D) 108.3

10. If the origin in a trend equation is shifted forward by three years, x in the equation $y = a + bx$ will be replaced by – 1

(A) $x - 3$ (B) $x + 3$

(C) $3x$ (D) none of the above

Directions for Question Nos. 11 and 12. Each of these questions contains two statements Assertion (A) and Reason (R). Each of the questions has four alternative and one of them is correct. you have to select one of the codes A, B, C and D given below :

(A) A and R are independently true and R is a correct explanation of A.

(B) A and R are independently true but R is not a correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

11. Assertion (A) : If $A=\{2, 4\}, B=\{2, 4, 5\}$ then $A \subset B$.

Reason (R) : Every element of the set A is also an element of the set B, then A is the subset of B. 1

12. Assertion (A) : The regression live of y and x is $y = a + bx$.

Reason (R) : x is dependent variable and y is the independent variable and value of x can be determined for the given value of y. 1

13. Evaluate $\int (x^2 + 4x + 1)dx$. 1

14. The unimodal is the distribution when there are two modes. 1

Correct the above statement.

15. Obtain the geometric mean of the data 1, 3 and 9. 1

16. Give one example of positive correlation between two variables. 1

17. Draw the scatter diagram of positive correlation but not perfect. 1

18. Draw the two regression lines when the coefficient of correlation is unity. 1

19. What is meant by the term best fit by the principle of least squares? 1

20. State the condition for which the finite population correction tends to unity. 1

21. (a) Examine the absolute minimum of the function f(x) where $f(x) = |x|, -2 \leq x \leq 2$. 2

Or

(b) Analyse the maximum or minimum value of the function f(x) where $f(x) = x^3 - 6x^2 + 28x + 3$

22. Show that the algebraic sum of deviations from the arithmetic mean is zero. 2

23. The maximum value of a distribution is 56. Find the minimum value of the distribution when the range is 40. 2

24. Draw the diagram of positively and negatively skewed distribution in separate diagrams. 2

25. Define the correlation between two variables. 2

26. Calculate Paasche's price index number from the following data : 2

	Base year		Current year	
Commodity	Price	Quantity	Price	Quantity
A	2	4	3	5
B	3	6	4	7

27. (a) Find the number of triangles can be formed by 6 different points in which no three of which are collinear except 3 points are collinear. 3

Or

(b) If 5 buses ply Imphal to Moreh, in how many ways can a man make a round trip from Imphal to Moreh and back to Imphal in all the buses plying in the route in such a way that he cannot return the same bus in the round trip?

28. (a) The results of two variables x and y for 20 pair of observations are as follows :

$n = 20$, $\sum x = 40$, $\sum y = 20$, $\sum x^2 = 680$, $\sum y^2 = 280$

$\sum xy = 320$. Calculate the coefficient of correlation. 3

Or

(b) Show that the coefficient of correlation between x and y is –1. When x and y are related by the equation $2x + 3y + 5 = 0$.

29. Convert the exponential curve to linear equation. Write also the normal equations for the linear equation. 3

30. A sample of size 2 is drawn from the population of 6 units. The mean square of the population is 4.8. Infers the efficiency of the estimator of the population mean between the simple random sampling without and with replacement. 3

31. (a) How many three digit numbers can be formed with the digits 1, 2, 3, 4 and 5, if no digit is repeated in any number ? 4

Or

(b) If A and B are subsets of the universal set U where A={1, 2, 4},

B={2, 3, 5}, U={1, 2, 3, 4, 5, 6}, find $A \cup B$ and $A \cap B$. Show that $(A \cup B)' = A' \cap B'$.

32. An analysis of monthly wages paid to the workers of the firms A and B belonging to the same industry gives the following results.

	Firm A	Firm B
No. of workers :	100	200
Total monthly wages(Rs.) :	14500	35200
Variance of the distribution of wages :	81	169

Which firm A or B has greater variability in individual wages ? 4

33. The equation of two regression lines are $8x + 9y = 12$ and $4x + 3y = 5$.

Infers the degree of correlation between x and y. 4

34. (a) Index numbers are Economic Barometers. 4

(i) What types of index number determine by the Government, Industrial and Business concerns for the regulations of dearness allowance or grant of bonus to the employees or workers ?

(ii) Which index number throw some light on the nature of variation in the general economic development and business activity of a country ?

Or

(b) The base year is the period which the comparisons of relative changes in the level of phenomenon are made.

(i) Why the base year must be a normal period ?

(ii) Why the base year should not be too distant from the given period?

35. Define a time series. Explain cyclic variations of the component of time series. 1+3=4

36. (a) How many natural numbers lying between 10 and 1000 which are divisible by 5 can be formed with the digits 0, 5, 6, 7, 8, 9 in which the digits can be repeated ? 6

Or

(b) Show that the maximum area of a rectangle incribed in a circle is a square.

37. (a) Calculate mean, median and mode of the following data: 6

Age in year :	2-6	6-10	10-14	14-18	18-22
No. of boys :	4	6	8	5	3

Or

(b) Calculate coefficient of quartile deviation from the following data :

Wages(in Rs.) less than :	10	20	30	40	50	60	70	80
No. of workers :	20	64	148	308	378	432	466	496

38. Show the Fisher's index number satisfies time reversal test from the following data : 6

Article	Year 2018		Year 2019	
	Price	Quantity	Price	Quantity
A	5.5	4	6.5	6
B	7.2	6	8.9	8
C	9.6	5	7.8	6
D	6.4	3	8.2	4

39. Construct the cost of living index for the year 2019 by taking 2017 as base year.

Item	Price(2017)	Price(2019)	Weight
Food	45.5	47.8	10
Clothing	26.4	30.4	20
Fuel and lighting	22.6	26.6	20
House rent	18.4	22.4	40
Miscellaneous	31.5	34.6	10

Mr. X was earning Rs. 20,500 in the base year and Rs. 25,400 in the currect year. Infers the standard of living of Mr. X in the current year as compare to base year. 6

40. Work out the centered 4 yearly moving average for the following data : 6

Year	Tonnage of goods carried	Year	Tonnage of goods carried
2001	2214	2007	2914
2002	2530	2008	3104
2003	2375	2009	3184
2004	2694	2010	2968
2005	2438	2011	3256
2006	2648	2012	3184

41. (a) What is a sample survey? State briefly the advantages of sample survey over complete enumeration. 6

Or

(b) Discuss the basic principles of a sample survey.