Roll No _____ (To be filled in by the candidate) (Academic Sessions 2020 – 2022 to 2023 – 2025)

STATISTICS 224 – 1st Annual (INTER PART – I) Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type) **PAPER CODE = 6187** Maximum Marks : 17

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	In a discrete probability distribution the sum of all the probabilities is :			
	(A) 0	(B) 1	(C) -1	(D) ∞
2	The standard deviation is always computed from :			
	(A) Mean	(B) Median	(C) Mode	(D) G.M
3	Which one is correct :			
	(A) G.M > H.M	(B) H.M > G.M	(C) H.M > A.M	(D) G.M > A.M
4	When 'r' objects chosen from 'n' objects without regard of order is called :			
	(A) Permutation	(B) Combination	(C) Factorial	(D) Multiplication
5	The price index $P_{on} = \dfrac{\Sigma p_n q_n}{\Sigma p_o q_n} \times 100$ is :			
	(A) Value index	(B) Fisher's index	(C) Laspeyre's index	(D) Paasche's index
6	A numerical characteristics of a sample is called :			
	(A) Statistic	(B) Parameter	(C) Variable	(D) Population
7	In a hypergeometric distribution N = 6, n = 2, K = 3 then the mean is :			
	(A) 2	(B) 3	(C) 1	(D) 4
8	If $\Sigma (X - 20) = 25$ and $\Sigma (X - 18) = 0$, then arithmetic mean is :			
	(A) 20	(B) 18	(C) 25	(D) Zero

(Turn Over)

(2)

1-9	If $P (A \cap B) = 0$ then events 'A' and 'B' are called :			
	(A) Mutually exclusive	(B) Exhaustive	(C) Independent	(D) Dependent
10	Life of a T.V. tube is a :			
	(A) Discrete variable	(B) Continuous variable	(C) Qualitative variable	(D) Constant
11	If P_{01} (Laspeyre's) = 110, P_{01} (Paasche's) = 120 then P_{01} (Fisher's) is :			
	(A) 110	(B) 120	(C) Zero	(D) 114.89
12	Classification of data according to locations or areas is called --- classification :			
	(A) Temporal	(B) Qualitative	(C) Geographical	(D) Quantitative
13	For a binomial distribution $p = q = \dfrac{1}{2}$ then the distribution is :			
	(A) Symmetrical	(B) Positively skewed	(C) Negatively skewed	(D) Not exists
14	A number assigned to outcome of a random experiment is called :			
	(A) Random number	(B) Random variable	(C) Constant	(D) Sample space
15	The parameters of hypergeometric distribution are :			
	(A) n, N	(B) n, K	(C) N, K	(D) n, N, K
16	Mean deviation for data 5, 5, 5 is :			
	(A) 5	(B) 25	(C) Zero	(D) Negative
17	An ogive is a :			
	(A) Frequency curve	(B) Frequency polygon		
	(C) Histogram	(D) Cumulative frequency polygon		

Roll No _____ _____ (To be filled in by the candidate) (Academic Sessions 2020 – 2022 to 2023 – 2025)

STATISTICS   224-1st Annual-(INTER PART – I)   Time Allowed : 2.40 hours

PAPER – I (Essay Type)   Maximum Marks : 68

SECTION – I

2. Write short answers to any EIGHT (8) questions :   16

(i) Describe the limitations of Statistics.

(ii) Differentiate between parameter and statistic.

(iii) Write sources of secondary data.

(iv) What is meant by " Measures of Central Tendency"?

(v) Calculate mean if n = 10, $\Sigma u = 100$, h = 2, where D = X – 50

(vi) Write down any two properties of geometric mean.

(vii) Find the value of median for the data : 3, -2, -1, -3, 0

(viii) If mode = 75, mean = 70, find median.

(ix) Name the 3 basic types of index numbers.

(x) Differentiate between simple and composite index number.

(xi) How link relatives are computed?

(xii) Given $\Sigma p_0 = 2550$ and $\Sigma p_1 = 2590$. Find price index number by using simple aggregative index method.

3. Write short answers to any EIGHT (8) questions :   16

(i) What is classification?

(ii) Write down the main parts of the table.

(iii) Define the term relative frequency and cumulative frequency.

(iv) Describe absolute dispersion.

(v) Given $\bar{x} = 10$ and var (x) = 4, find $\bar{y}$ and var (y) when y = 2x – 1

(vi) If lower quartile is 20 and quartile deviation is 5, find upper quartile.

(vii) Define range and its co-efficient.

(viii) If S.D. of a distribution is 4, find 2nd moment about mean.

(ix) Explain properties of random experiment.

(x) Write the sample space when 3 coins are tossed.

(xi) Differentiate between simple and compound events.

(xii) What is meant by conditional probability?

4. Write short answers to any SIX (6) questions :   12

(i) Define continuous random variable.

(ii) What is random experiment?

(iii) What is meant by mathematical expectation?

(iv) If E(X) = 2, then find E (2X + 3)

(v) Calculate mean and variance of binomial distribution, if n = 5 and $q = \dfrac{1}{3}$

(vi) Write down the probability function of hypergeometric distribution.

(vii) Explain and define binomial experiment.

4. (viii) Which type of sampling is associated with binomial distribution?

   (ix) Write down the parameters of hypergeometric distribution.

SECTION – II 🎀 pakcity.org 🎀

Note : **Attempt any THREE questions.**

5. (a) The A.M. and G.M of three numbers are 34 and 18 respectively. Find all three numbers, when the G.M of the first two numbers is 9.   4

   (b) The following data has been obtained from a frequency distribution of a continuous variable x after making the substitution : $u = \dfrac{x-136.5}{6}$:   4

u	-4	-3	-2	-1	0	1	2	3
f	2	5	8	18	22	13	8	4

   Calculate H.M.

6. (a) What will be the standard deviation and the variance in each of the following cases :   4
   (i) 2x   (ii) x + 2   (iii) 2x +4   if var(x) = 25

   (b) Calculate the first three moments about mean for the observations :   4
   81, 87, 90, 93, 94, 95

7. (a) Construct the following weighted I.No's of prices for the year 1981 from the data given below :   4
   (i) Laspayre's I.No   (ii) Paasche's I.No.

Commodity	Prices		Quantity	
	1980 (Base)	1981	1980 (Base)	1981
A	10	12	20	22
B	8	8	16	18
C	5	6	10	11
D	4	4	7	8

   (b) Find the probability $P(A \cap B) = ?$ given that $P(A) = 0.25$, $P(B) = 0.60$ Assuming that A and B are independent.   4

8. (a) Let X be a random variable with the probability distribution as follows :   4

X	1	2	3	4	5
f (X)	0.125	0.350	0.300	0.125	0.100

   Show that $E(3X - 2) = 3E(X) - 2$

   (b) A continuous random variable ' x ' has density function :   4
   $f(x) = 2x$ for $0 \le x \le 1$
   $= 0$ elsewhere
   Find $P(0 \le x \le 0.5)$

9. (a) If 20% of the bolts produced by a machine are defective, determine the probability that out of 4 bolts chosen at random (i) Zero defective (ii) 2 bolts are defective   4

   (b) A committee of size 3 is selected from 4 men and 2 women. Find the probability distribution by hypergeometric experiment for the number of men on the committee.   4

23-224-(Essay Type)- 15500

Lahore Board-2023

Roll No _____ (To be filled in by the candidate) (Academic Sessions 2019 – 2021 to 2022 – 2024)

STATISTICS   223 – 1ˢᵗ Annual (INTER PART – I)   Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type)   **PAPER CODE = 6181**   Maximum Marks : 17

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	Yield from a plot is ---- variable :
	(A) Discrete (B) Continuous (C) Attribute (D) Categorical
2	Teaching and research journals are --- sources for collection of data :
	(A) Primary (B) Secondary (C) Local (D) Semi-official
3	Median divides the set of data into --- equal parts :
	(A) 2 (B) 4 (C) 10 (D) 100
4	If $y = ax + b$ then $\bar{y} = ---$:
	(A) $a\bar{x}$ (B) $\bar{x} + b$ (C) $a\bar{x} + b$ (D) $\bar{x}$
5	$\Sigma(y - \bar{y}) = ---$:
	(A) 0 (B) 1 (C) Least (D) > 0
6	If variance of a set of data is 25, then its standard deviation is :
	(A) 25 (B) 12.5 (C) 7 (D) 5
7	First moment about mean is always :
	(A) Positive (B) 0 (C) Mean (D) 1
8	If $y = ax + b$ then $var(y) = ---$:
	(A) $a\,var(x)$ (B) $a^2\,var(x) + b$ (C) $a^2\,var(x)$ (D) $a\,var(x) + b$

1-9	Laspeyre's Index No. is also called :
	(A) Base year weighted (B) Current year weighted (C) Ideal (D) Simple
10	In chain base method, base period is :
	(A) Fixed (B) Constant (C) First (D) Not fixed
11	When a coin is tossed three times, $n(s) = ---$:
	(A) 2 (B) 4 (C) 8 (D) 6
12	Probability of drawing a card of ace is :
	(A) $\frac{1}{2}$ (B) $\frac{1}{13}$ (C) $\frac{1}{4}$ (D) $\frac{1}{5}$
13	$E(X^2) = 29$ and $E(X) = 4$, then $Var(X) = ---$:
	(A) 25 (B) 13 (C) $\sqrt{13}$ (D) 5
14	A random variable is also named as :
	(A) Chance variable (B) Discrete variable (C) Qualitative variable (D) Attribute
15	No. of parameters in hyper-geometric distribution :
	(A) 1 (B) 2 (C) 3 (D) 4
16	Mean of binomial distribution :
	(A) nq (B) pq (C) npq (D) np
17	Limit of binomial distribution is :
	(A) 0 to n (B) 0 to 1 (C) $-\infty$ to $+\infty$ (D) 0 to ∞

23-223-(Objective Type)- 3250 (6181)

Lahore Board-2023

SECTION – I

2. Write short answers to any EIGHT (8) questions :   **16**

    (i) Describe the importance of statistics.

    (ii) Define "Statistics" in plural sense.

    (iii) Define arithmetic mean.

    (iv) Define harmonic mean.

    (v) In a distribution, Mean is " 50 " and Median is " 10 ". Find Mode of the distribution.

    (vi) If for 10 observations, $\Sigma(X - 23) = -17$, find the value of Mean.

    (vii) Write down any two merits of " Median ".

    (viii) Define composite index number.

    (ix) Define un-weighted index number.

    (x) What is fixed base method?

    (xi) Define Fisher Index Number.

    (xii) If $\Sigma p_n . q_o = 460$, $\Sigma p_o . q_o = 115$, compute Laspeyre's Index Number.

3. Write short answers to any EIGHT (8) questions :   **16**

    (i) Write down the main parts of a table.

    (ii) Differentiate between ungroup data and group data.

    (iii) Define range. How will you calculate it for grouped data?

    (iv) Write down the main properties of S.D.

    (v) What is Kurtosis?

    (vi) If $Q_1 = 88.03$ and $Q_3 = 94.90$, find quartile deviation.

    (vii) If $X = 30, 31, 32, 33, 34, 35, 36, 37$, find range and its co-efficient.

    (viii) How we calculate co-efficient of quartile deviation?

    (ix) Define combination.

    (x) Define sample space.

    (xi) What are dependent events?

    (xii) What is factorial?

4. Write short answers to any SIX (6) questions :   **12**

    (i) Define binomial random experiment.

    (ii) If n = 10 and p = 0.4, then find the mean and variance of binomial distribution.

    (iii) Define hypergeometric experiment.

    (iv) If N = 7 , n = 5 and k = 2, find P (X = 0)

    (v) Define hypergeometric probability distribution.

    (vi) What do you understand by random number?

    (vii) Differentiate between discrete random variable and continuous random variable.

4. (viii) Define mathematical expectation.

(ix) Given that $E(X) = 0.63$ and $Var(X) = 0.2331$, then find $E(X^2)$

SECTION – II

Note :   Attempt any THREE questions.

5. (a) Consider the following data :   4

Classes	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
Frequency	4	8	16	8	4

Calculate Harmonic Mean.

(b) Find the value of mode from the data given below :   4

Marks	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34
f	2	4	8	6	3

6. (a) Find mean deviation from the median from the following data :   4

Age	5 – 10	10 – 15	15 – 20	20 – 25
f	10	20	30	15

(b) Find the co-efficient of Q.D. from the following data :   4

Groups	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29
f	3	4	12	6	5

7. (a) Given the prices of three commodities, construct the chain indices using median as an average :   4
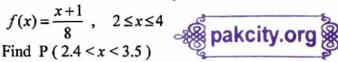
Years	Commodities		
	A	B	C
2014	105	84	119
2015	110	96	126
2016	110	103	132
2017	120	116	144

(b) From a pack of 52 playing cards, two cards are chosen at random. What is the probability that :   4
   (i) Both are diamonds.   (ii) One is ace and other is king.

8. (a) Let X be a random variable with the probability distribution : 4

X	1	2	3	4	5
P(X)	0.125	0.450	0.250	0.050	0.125

Show that $E(5X + 8) = 5E(X) + 8$

(b) A continuous r.v 'X' has p.d.f. as :   4

$$f(x) = \frac{x+1}{8}, \quad 2 \le x \le 4$$

Find $P(2.4 < x < 3.5)$

9. (a) A fair die is thrown 6 times. Let X be a random variable showing number of sixes.
   Find (i) $P(X = 2)$ (ii) $P(X = 6)$ 4

(b) Five balls are drawn from a box containing 4 white and 7 black balls. If X denotes the number of black balls drawn, find (i) $P(X = 2)$ (ii) $P(X = 5)$ 4

23-223-(Essay Type)- 13000

Lahore Board-2022

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	The index given by $\dfrac{\Sigma p_n q_n}{\Sigma p_o q_n}$ is : pakcity.org
	(A) Laspeyre's index (B) Paasche's index (C) Value index (D) Fisher's index
2	Geometric mean of 2 and 8 is :
	(A) 8 (B) 4 (C) 5 (D) 2
3	Which of the following cannot be the probability of an event :
	(A) 1.75 (B) Zero (C) 0.36 (D) 0.82
4	Total angles of a pie chart are :
	(A) 360° (B) 180° (C) 190° (D) 90°
5	In a binomial distribution, the successive trails are :
	(A) Independent (B) Dependent (C) Mutually exclusive (D) Fixed
6	If $\Sigma(X-\bar{X})^2 = 232$ and n = 9, then m_2 is :
	(A) 24.78 25.78 26.78 (D) 27.78
7	If $\Sigma X = 400$ and ___ = 25, then n is
	(A) 12 (B) 14 (C) 18 (D) 16
8	Quantities which do no ___
	(A) Variables (B) Constants (C) Statistic (D) All
9	In chain base method, the base period is :
	(A) Fixed (B) Constant (C) Changed (D) None
10	$E[X - E(X)]$ is equal to :
	(A) Variance (B) Standard deviation (C) Mean (D) Zero
11	First moment about mean is always equal to :
	(A) 1 (B) -1 (C) 2 (D) Zero
12	If X = a , then $\bar{X}$ is equal to :
	(A) x (B) 0 (C) a (D) 1
13	Binomial distribution is negatively skewed if :
	(A) $p < q$ (B) $p > q$ (C) $p = q$ (D) $p = 0.5$
14	If a distribution is mesokurtic, then :
	(A) $\beta_2 = 3$ (B) $\beta_2 < 3$ (C) $\beta_2 > 3$ (D) $\beta_2 \neq 3$
15	The number of values falling in a particular category is called :
	(A) Tally mark (B) Class (C) Frequency (D) Class mark
16	Probability of sample space is equal to :
	(A) Zero (B) 1 (C) -1 (D) 2
17	If X is a random variable, then V(X) is :
	(A) $E[X - E(X)]$ (B) $E[X - E(X)]^2$ (C) $E(X^2) - [E(X)]^2$ (D) Both B and C
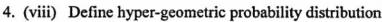
SECTION – I

2. Write short answers to any EIGHT (8) questions : 16

   (i) Differentiate between population and sample.

   (ii) Define parameter with example.

   (iii) What is statistical average?

   (iv) What is the formula of combined arithmetic mean?

   (v) If the values of Q_2 , D_5 and P_{50} are equal to 27.12, then find median.

   (vi) Explain mode with example.

   (vii) Average = 70, number of values = 5, find the sum of values.

   (viii) Define geometric mean.

   (ix) Explain the chain base method.

   (x) What is Laspeyre's index number?

   (xi) Why Fisher's index number is called ideal?

   (xii) What is base period?

3. Write short answers to any EIGHT (8) questions. 16

   (i) What are the different methods of presentation of data?

   (ii) Define class boundaries.

   (iii) Given that $Q_3 = 178$,   find the value of Q_1

   (iv) How is variance defined, also write its formulae?

   (v) A student calculated mean and standard deviation of 25 observations as 20 and 4 respectively. Find the value of coefficient of variation.

   (vi) Define symmetrical distribution.

   (vii) If variance is 5 and third moment about mean is -12.8, find b_1 and discuss the distribution.

   (viii) If mean = 20 , mode = 15 and coefficient of skewness equal to 1, then find variance.

   (ix) Define combination with example.

   (x) What is the answer of $^6C_4$ and $^6P_4$?

   (xi) Define the terms (i) Event. (ii) Sure event.

   (xii) If $P(A) = 0.6$, and $P(B/A) = 0.4$, then find $P(A \cap B)$

4. Write short answers to any SIX (6) questions : 12

   (i) Three coins are tossed, let X be the number of heads. Write all possible values for X.

   (ii) Define continuous random variable.

   (iii) What is meant by probability distribution?

   (iv) What are properties of expectation?

   (v) Given a random variable X with $E(X) = 0.63$ and $var(X) = 0.2331$, find $E(X^2)$

   (vi) What are properties of binomial distribution?
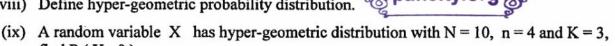
   (vii) In a binomial distribution mean = 4.2 and variance = 1.68, find its both parameters.

(Turn Over)

Lahore Board-2022

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4. (viii) Define hyper-geometric probability distribution.

(ix) A random variable X has hyper-geometric distribution with N = 10, n = 4 and K = 3, find P (X= 0)

SECTION – II

Note : **Attempt any THREE questions.**

5. (a) Find the mean for the following distribution : 4

Classes	0 – 10	10 – 40	40 – 90	90 – 100
f	40	110	150	20

(b) Find the value of upper quartile : Q_3 4

Groups	0 – 4.9	5 – 9.9	10 – 14.9	15 – 19.9
f	3	4	9	4

6. (a) Calculate mean deviation from median from the given data : 4

Marks	20 – 29	30 – 39	40 – 49	50 – 59
No. of students	3	20	13	6

(b) Compute the coefficient of skewness using the averages and standard deviation. 4

Groups	0 – 10	10 – 20	20 – 30	30 – 40
f	4	12	7	2

7. (a) Find index number taking (i) the year 1930 as base. (ii) average of 1st 3 years as base : 4

Years	1930	1931	1932	1933	1934	1935	1936	1937	1938
Prices	4	5	6	7	8	10	9	10	11

(b) Two cards are drawn from a well-shuffled pack of 52 cards. Find the probability that : 4
(i) One is king and the other is queen. (ii) Both are of different colours.

8. (a) A fair coin is tossed three times. Set ' X ' be a random variable which denotes the number of heads. Make the probability distribution of X. 4

(b) A continuous random variable ' X ' has probability density function given by :
$f(x) = c. x$ for $0 < x < 2$

Find (i) C   (ii) P ($1 < x < 1.5$) 4

9. (a) In a binomial distribution, n = 4 and $p = \dfrac{1}{3}$. Obtain the probability distribution of 0, 1, 2, 3 and 4 successes. 4

(b) Given that ' X ' is a hypergeometric random variable with N = 8 , n = 3 and K = 5. Compute P ($X \leq 3$) 4

23-222-(Essay Type)- 13000

Roll No _____ (To be filled in by the candidate) (Academic Sessions 2017 – 2019 to 2020 – 2022)

STATISTICS   221 -(INTER PART – I)   Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type)   **PAPER CODE = 6183**   Maximum Marks : 17

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	Upper quartile Q_3 is equal to :				
	(A) $\dfrac{Q_1 + Q_2}{2}$	(B) $Q_2 - Q_1$	(C) P_{75}	(D) D_7	
2	In weighted price index numbers, the weights are :				
	(A) Values	(B) Prices	(C) Quantities	(D) Quantity relatives	
3	If $E(x) = 5$, $E(y) = 3$, then $E(x + y) = $:				
	(A) 2	(B) 3	(C) 5	(D) 8	
4	Hyper geometric distribution has parameters :				
	(A) p, q	(B) n, N, k	(C) n, p	(D) n, k	
5	Primary data are same as :				
	(A) Arrayed data	(B) Secondary data	(C) Raw data	(D) Grouped data	
6	The probability of a sure event is :				
	(A) 1.2	(B) – 1	(C) 0	(D) 1	
7	Sum of the deviations from mean is :				
	(A) – 1	(B) 0	(C) 1	(D) 2	
8	An orderly arrangement of objects is called :				
	(A) Combination	(B) Permutation	(C) Union	(D) Intersection	
9	Binomial random variable can assume values :				
	(A) 1, 2, ------	(B) 0, 1, 2, ------	(C) 1, 2, ------, n	(D) 0, 1, 2, -----, n	
10	Standard deviation is independent of :				
	(A) Origin and scale	(B) Origin	(C) Scale	(D) Data	
11	A graph of a frequency distribution is :				
	(A) Bar diagram	(B) Pie chart	(C) Historigram	(D) Histogram	
12	If var $(x) = 9$, then S.D $(2x + 4)$ is :				
	(A) 6	(B) 12	(C) 10	(D) 20	
13	Measure of dispersion can never be :				
	(A) 0	(B) 1	(C) Greater than zero	(D) Less than zero	
14	Base year weighted index numbers are :				
	(A) Laspeyre's	(B) Paasche's	(C) Fisher's	(D) Marshall's	
15	Mean of a constant ' K ' is :				
	(A) K	(B) K + 2	(C) K – 2	(D) K + 3	
16	If 'c' is a constant then E (c) = :				
	(A) E $(x + c)$	(B) E (x)	(C) c	(D) E $(x - c)$	
17	Nature of binomial variable is :				
	(A) Continuous	(B) Discrete	(C) Qualitative	(D) Dependent	

STATISTICS 221-(INTER PART – I) Time Allowed : 2.40 hours

PAPER – I (Essay Type) Lahore Board-2021 Maximum Marks : 68

SECTION – I

2. Write short answers to any EIGHT (8) questions : 16

(i) Define population.

(ii) Define secondary data.

(iii) What is an average?

(iv) Define geometric mean.

(v) Define the empirical relation between mean, median and mode.

(vi) Compute the median for the data $-2, 5, 0, -1, 4, 2$

(vii) $n = 15$, $\Sigma(X - 20) = 45$, find arithmetic mean.

(viii) Define quartiles.

(ix) Define an index number.

(x) Define link relatives.

(xi) Given that $\Sigma p_0 q_0 = 352$, $\Sigma p_1 q_0 = 422$, $\Sigma p_0 q_1 = 402$, $\Sigma p_1 q_1 = 481$, then find Fisher Ideal Index number.

(xii) What are weighted index numbers?

3. Write short answers to any EIGHT (8) questions : 16

(i) Define tabulation.

(ii) Define class interval.

(iii) What is meant by relative dispersion?

(iv) Define quartile deviation.

(v) If var $(x) = 2$ then find var $(3x + 5)$

(vi) Define coefficient of variation.

(vii) If $Q_1 = 15$ and $Q_3 = 25$, find coefficient of quartile deviation.

(viii) Define skewness.

(ix) Define combination.

(x) Define compound event.

(xi) Write any two properties of a random experiment.

(xii) What is meant by mutually exclusive events?

4. Write short answers to any SIX (6) questions : 12

(i) Define continuous random variable.

(ii) Given X = 0, 1, 2 , P (x) = 4c, 3c, 5c, find the value of 'c'

(iii) Write down two properties of expectation.

(iv) If E (X)= 3 and E (X^2) = 12, then find variance of ' X '

(v) Define binomial experiment.

(vi) A random variable 'X' is binomially distributed when n = 15 and p = 0.4. Find mean and variance of 'X'.

(vii) Write hypergeometric probability function.

(Turn Over)

4. (viii) Write any two properties of hypergeometric experiment.

   (ix) If $n = 20$, $p = \dfrac{3}{5}$ then find variance of binomial distribution.

SECTION – II

Note : **Attempt any THREE questions.**

5. (a) Find geometric mean of the following values of the variable ' X ' :   4
   32, 35, 37, 53, 48, 71, 64, 78, 81, 84

   (b) Find arithmetic mean for the following distribution :   4

Classes	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
Frequency	14	20	32	7	3	2

6. (a) Given the following frequency distribution, compute the standard deviation.   4

y	0	1	2	3	4
f	17	9	6	5	3

   (b) The mean of 200 items is 50 and the standard deviation is 4. Find the sum of
   squares (ΣX^2) of all these items.   4

7. (a) Calculate unweighted price index for 1994 when the procurement / support prices of
   agricultural commodities in rupees per 40 kg in 1980 and 1994 are given as following :   4

Commodities	Prices	
	1980	1994
Wheat	58	160
Rice	118	360
Potatoes	27	19
Onion	80	84

   (b) A pair of dice is rolled. Find the probability of getting a total of either 5 or 11.   4

8. (a) For the probability distribution of X given below, find that : (i) E(X) (ii) E(X^2)   4

X	0	1	2	3
P(x)	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{2}{10}$	$\frac{1}{10}$

   (b) The number of automobile accidents in a city are 1, 2, 3, 4 with corresponding
   probabilities $\frac{1}{8}$, $\frac{2}{8}$, $\frac{2}{8}$ and $\frac{3}{8}$. What is the expected number of accidents daily.   4

9. (a) An event has $P = \frac{3}{8}$, find the complete binomial distribution for $n = 5$ trials.   4

   (b) A committee of size 5 is to be selected from 3 women and 5 men, find the expected
   number of women on the committee.   4

23-221-(Essay Type)- 13000

Roll No _____ (To be filled in by the candidate) (Academic Sessions 2015 – 2017 to 2018 – 2020)

STATISTICS 219 -(INTER PART – I) Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type) **PAPER CODE = 6187** Maximum Marks : 17

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	An expected value of a random variable is equal to its :
	(A) Variance (B) S.D. (C) Co-variance (D) Mean
2	Difference between largest and smallest value is called :
	(A) Standard deviation (B) Mean deviation (C) Quartile deviation (D) Range
3	If a distribution has two modes then it is called :
	(A) Uni-model (B) Bi-model (C) Tri-model (D) None of these
4	In fixed base method, the base period should be :
	(A) 100 (B) Never 100 (C) Changed (D) None of these
5	If $\sqrt{\beta_1} = 0$ then distribution is :
	(A) Skewed (B) Symmetrical (C) – vely skewed (D) None of these
6	The process of systematic arrangement of data into rows and columns is called :
	(A) Classification (B) Stub (C) Box head (D) Tabulation
7	In hypergeometric experiment the successive trials are :
	(A) Independent (B) Dependent (C) Fixed (D) Infinite
8	For certain frequency distribution $\Sigma(X-20)=25$ and $\Sigma(X-18)=0$, then mean is :
	(A) 20 (B) 25 (C) 18 (D) Zero
9	If a coin is tossed four times, the number of total sample points will be :
	(A) 4 (B) 8 (C) 16 (D) 2
10	A constant can assume values :
	(A) Fixed (B) Not fixed (C) Infinity (D) Variable values
11	An index number computed for a single commodity is called :
	(A) Simple index (B) Composite index
	(C) Weighted index (D) Retail price index
12	The difference between the upper and lower class boundary of a class is known as :
	(A) Class frequency (B) Class mark (C) Class limit (D) None of these
13	Random numbers are sequence of digits from the set :
	(A) { 0, 1, 2, -----10 } (B) { 0, 1, 2, ------9 }
	(C) { 1, 2, ----- 10 } (D) { 1, 2, ------9 }
14	A set of all possible outcomes of a random experiment is called :
	(A) Null set (B) Sample points (C) Sample space (D) Simple events
15	In binomial probability distribution $\left(\frac{1}{5}+\frac{4}{5}\right)^5$ parameters are :
	(A) $\left(25, \frac{4}{5}\right)$ (B) $\left(100, \frac{4}{5}\right)$ (C) $\left(5, \frac{4}{5}\right)$ (D) $\left(\frac{1}{5}, 5\right)$
16	The half of the difference between upper and lower quartile is :
	(A) Mean deviation (B) Quartile deviation
	(C) Inter quartile range (D) Range
17	The sum of square of deviation from mean is :
	(A) Least (B) Infinity (C) Zero (D) None of these

23-219-(Objective Type)- 3125 (6187)

SECTION – I

2. **Write short answers to any EIGHT (8) questions :**   16

(i) Describe any two uses of statistics.

(ii) Distinguish between primary and secondary data.

(iii) Define harmonic mean.

(iv) Calculate geometric mean of $X = 1, 1, 27$.

(v) Define mode and give its formula in case of grouped data.

(vi) Write down any two demerits of geometric mean.

(vii) In a moderately skewed distribution, mean = 100, mode = 95 and S.D. = 10. Find coefficient of skewness.

(viii) Distinguish between simple and composite index numbers.

(ix) Explain important uses of index numbers.

(x) Define Paasche's index number.

(xi) Given $\Sigma P_0 = 660$, $\Sigma P_1 = 924$, $\Sigma P_2 = 1056$, then compute simple aggregative price index numbers.

(xii) Given $\Sigma P_1 q_0 = 1250$, $\Sigma P_0 q_0 = 1200$, find base-year weighted index number.

3. **Write short answers to any EIGHT (8) questions :**   16

(i) Define the term classification.

(ii) Define histogram.

(iii) What does kurtosis mean?

(iv) S.D. of a distribution is 4. Find 2nd moment about mean.

(v) Define the term symmetry of a distribution.

(vi) Find variance if $n = 25$, $\Sigma X = 480$ and $\Sigma X^2 = 15735$

(vii) Define co-efficient of variation.

(viii) If var (x) = 10 and y = 5x + 20, then find var (y)

(ix) Define the term combination.

(x) Distinguish between simple and compound events.

(xi) What is the range of probability?

(xii) Find $P(B/A)$ if $P(A \cap B) = 0.3$ and $P(A) = 0.7$

4. **Write short answers to any SIX (6) questions :**   12

(i) Enlist properties of probability mass function.

(ii) Describe continuous random variable.

(iii) What are random numbers.

(iv) Enlist two properties of expectations.

(v) If E(X) = 1.4, then find E ($5x - 4$)

(vi) What is Bernoulli trial?

(vii) What are the properties of binomial distribution?

(Turn Over)

4. (viii) If $\bar{n} = 20$, $P = \dfrac{3}{5}$ then find mean of binomial distribution

(ix) What is the mean and variance of hypergeometric distribution?

SECTION – II

Note : **Attempt any THREE questions.**

5. (a) Find arithmetic mean by short cut method :   4

Classes	86 – 90	91 – 95	96 – 100	101 – 105	106 – 110
Frequency	6	4	10	6	3

(b) Find upper quartile from the following frequency distribution :   4

Classes	9.3 – 9.7	9.8 – 10.2	10.3 – 10.7	10.8 – 11.2	11.3 – 11.7
f	2	5	12	7	4

6. (a) Calculate Bowley's coefficient of skewness from the given data :   4

Groups	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59
f	14	25	40	32	17

(b) The following table gives the marks of students :   4

Marks	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59
f	8	87	190	86	20

Calculate standard deviation.

7. (a)

Years	A	B	C	D
1990	30	12	20	11
1991	30.5	15	21	10
1992	32	17	23	15
1993	33	16	27	14

Taking the year 1990 as base year, find simple aggregative index number.   4

(b) Assume that ' X ' is a number chosen from a set of integers between
1 and 20 inclusive. What is the probability that 'X' is a :
(i) Double digit number   (ii) Multiple of 4   4

8. (a) $f(x) = \dfrac{4 - x}{4}$; $1 \le X \le 3$. Is $f(x)$ a probability density function?

Also find   P (1.5 < X < 2.5)
P (1.5 ≤ X < 2.5)
P (1.5 < X ≤ 2.5)
P (1.5 ≤ X ≤ 2.5)   4

(b) Find E (X) and V (X) for the following data on discrete random variable X :   4

X	0	1	2
$f(x)$	$\dfrac{1}{4}$	$\dfrac{1}{2}$	$\dfrac{1}{4}$

9. (a) If 20% bolts produced by a machine are defective, determine the probability that
out of 4 bolts chosen at random (i) Zero bolt is defective (ii) 2 bolts are defective   4

(b) Three balls are drawn from a bag containing 5 white and 3 black balls. If X denotes
the number of white balls, then find the probability distribution of X?   4

23-219-(Essay Type)- 12500

Roll No _____ (To be filled in by the candidate) (Academic Sessions 2015 – 2017 to 2017 – 2019)

STATISTICS   218 -(INTER PART – I)   Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type)   **PAPER CODE = 6183**   Maximum Marks : 17

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	In qualitative data, the most suitable average is :	
	(A) Arithmetic mean (B) Geometric mean (C) Harmonic mean (D) Mode	
2	If $\beta_2 < 3$ the distribution is :	
	(A) Mesokurtic (B) Leptokurtic (C) Platykurtic (D) Symmetrical	
3	If X and Y are two random variables then $E(X - Y) =$:	
	(A) $E(X) + E(Y)$ (B) $E(X) - E(Y)$ (C) $E(X)\,E(Y)$ (D) $XE(Y)$	
4	In hyper-geometric distributions, trials are :	
	(A) Independent (B) Dependent (C) Mutually exclusive (D) Not fixed	
5	Brand of a soap is ---- variable :	
	(A) Quantitative (B) Qualitative (C) Imaginary (D) Continuous	
6	Probability of an event cannot be :	
	(A) 0 (B) Negative (C) 1 (D) Positive	
7	Headings for different columns in a table are called :	
	(A) Stub (B) Title (C) Column captions (D) Prefatory note	
8	Laspayre's index number is also named as :	
	(A) Current year weighted (B) Base year weighted	
	(C) Ideal index number (D) Simple index number	
9	If $p = q = \dfrac{1}{2}$, the binomial distribution is a :	
	(A) Skewed (B) Asymmetrical (C) Symmetrical (D) Positively skewed	
10	S.D $(y + a) =$ ---- :	
	(A) SD $(y) + a$ (B) $|a|$ SD (y) (C) SD (y) (D) a^2 SD (y)	
11	A graph of cummulative frequency curve is called :	
	(A) Histogram (B) Pie chart (C) Bar chart (D) Ogive	
12	If $\sqrt{\beta_1} = 0$, the distribution is :	
	(A) Positively skewed (B) Symmetrical	
	(C) Negatively skewed (D) Leptokurtic	
13	In a symmetrical distribution :	
	(A) Mean = median = mode (B) Mean > median > mode	
	(C) Mean < median < mode (D) Mean > median < mode	
14	In index number base year should be :	
	(A) First year (B) Second year (C) Last year (D) Normal year	
15	$\Sigma(y - \bar{y}) =$:	
	(A) 0 (B) 1 (C) Least (D) Minimum	
16	If A and B are mutually exclusive events then $P(A \cup B)$ equal to :	
	(A) $P(A) + P(B)$ (B) $P(A) + P(B) + P(A \cap B)$	
	(C) $P(A) + P(B) - P(A \cap B)$ (D) $P(A) - P(B) - P(A \cap B)$	
17	A random variable is also named as :	
	(A) Chance variable (B) Qualitative variable	
	(C) Attribute (D) Discrete variable	

4. (v) Given $X = 1, 2, 3, 4, 5$ and $P(X) = \frac{1}{10}, \frac{3}{10}, P, \frac{2}{10}, \frac{1}{10}$. Find the value of P.

(vi) Define a Bernoulli trial.

(vii) A random variable X has a binomial distribution with $n = 5$ and $P = 0.2$, find $P(X = 2)$.

(viii) Define hypergeometric experiment.

(ix) Given $N = 10$, $n = 4$ and $K = 5$, find $E(X)$.

SECTION – II

Note : Attempt any THREE questions.

5. (a) (i) A man gets a rise of 10% in salary at the end of his first year of service and further rises of 20% and 25% at end of the second and third year respectively. The rise in each case being calculated on his salary at the beginning of the year. What is annual percentage average increase? **2**

(ii) Find average of 10 km / h, 20 km / h and 25 km / h. **2**

(b) (i) Compute mode of the data given below : **2**

Wages	4 – 6	6 – 8	8 – 10	10 – 12	12 – 14	14 – 16
Employees	13	110	180	105	18	8

(ii) Also find median of data of part (i) of Q.No. 5 (b). **2**

6. (a) Following are the heights (cms) of 5 students, measured at the time of registration. Compute mean deviation about mean and mean coefficient of dispersion. **4**
Heights (cms) : 88.03 , 94.50 , 94.90 , 95.50 , 84.60

(b) The first three moments of a distribution about the value 2 of a variable X, are 1, 16 and – 40. Show that the mean is 3, variance is 15 and third moment about mean m_3 is – 86. **4**

7. (a) Find chain indices for the following data : **4**

Year	2010	2011	2012	2013	2014	2015	2016
Price	114	118	119	125	130	131	135

(b) Three coins are tossed. Find the probability that :
(i) Exactly 3 tails appear.   (ii) At most 2 tails appear. **4**

8. (a) The probability distribution of a random variable X is given below :

x	1	2	3	4	5
P(x)	0.1	0.3	0.3	0.2	0.1

Find mean and variance of X. **4**

(b) A continuous random variable X has probability density function :
$$f(x) = \frac{2}{27}(x+1) \quad 2 \le x \le 5$$ **4**
Find : (i) $P(x < 4)$ (ii) $P(3 \le X \le 4)$

9. (a) Five dice are tossed 960 times. Find the expected frequencies when throwing of 4, 5, or 6 is regarded as success. **4**

(b) Given that X is a hypergeometric random variable with $N = 8$, $n = 3$ and $K = 5$, compute $P(X \le 2)$ **4**

23-218-(Essay Type)- 11500