

Objective
Paper Code**6185**

Intermediate Part First

STATISTICS (Objective)

Time: 20 Minutes

Marks: 17

pakcity.org

Roll No. : _____



Q.No.1

You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

| S.# | Questions | A | B | C | D |
|-----|--|-------------------|--------------------|-------------------|---------------------|
| 1 | When the price of a year is divided by the price of the preceding year, we get: | Value index | Link relative | Simple relative | Quantity index |
| 2 | The range of the values 6, 8, 10, -5, -10 is: | 20 | 10 | 0 | -10 |
| 3 | In a symmetrical distribution, $Q_3 - Q_1 = 20$, median = 15. Q_3 is equal to: | 10 | 15 | 20 | 25 |
| 4 | If $\bar{X} = 33$, which will be minimum? | $\sum X^2$ | $\sum (X - 66)^2$ | $\sum (X - 33)^2$ | $\sum (X + 33)^2$ |
| 5 | A distribution with two modes is called: | Unimodal | Bimodal | Multimodal | Normal |
| 6 | A frequency polygon is a closed figure which is: | One sided | Two sided | Three sided | Many sided |
| 7 | The headings of the rows of a table are called: | Captions | Titles | Stubs | Prefactory notes |
| 8 | A measure computed on the basis of a census is called: | Parameter | Statistic | Constant | Class mark |
| 9 | A set of all units of interest in a study is called: | Sample | Population | Parameter | Statistic |
| 10 | The mean of the hypergeometric distribution is: | $\frac{nk}{N}$ | $\frac{Nk}{n}$ | $\frac{Nn}{k}$ | $\frac{n+k}{N}$ |
| 11 | In binomial experiment, the successive trials are: | Variable | Dependent | Independent | Without replacement |
| 12 | The binomial probability distribution is symmetrical when: | $P = 0.1$ | $P = q$ | $P < q$ | $P > q$ |
| 13 | If k is a constant in a continuous probability distribution, then $P(X = k)$ is always equal to: | 0 | 1 | -1 | k |
| 14 | An expected value of a random variable is equal to its: | Variance | Standard deviation | Mode | Mean |
| 15 | A fair die is rolled. Probability of getting face more than 4 is: | $\frac{1}{2}$ | $\frac{2}{3}$ | $\frac{1}{3}$ | $\frac{5}{6}$ |
| 16 | For every event A, probability of A is: | ≤ 0 | ≥ 0 | > 1 | < 0 |
| 17 | Base year quantities are used, as weights, in: | Laspeyre's method | Paasche's method | Fisher's method | Chain base method |

1119-XI124-5000

STATISTICS (Subjective)

Time: 02:40 Hours

Marks: 68

**SECTION – I****2. Write short answers of any EIGHT parts.**

16

- Explain the concept of cost of living index number.
- What is Laspeyre's price index number. Write its formula.
- Given $\sum P_0 q_n = 950$ and $\sum P_n q_n = 1310$ find Paasche's price index number.
- Define harmonic mean and write its formula for grouped data.
- If mean = 5, median = 6, find mode.
- Describe two uses of index number.
- Describe two demerits of geometric mean.
- Given $\sum (x - 10) = 0$, $n = 5$ find mean.
- What is difference between simple arithmetic mean and weighted mean?
- What is meant by secondary data? Write sources of secondary data.
- Narrate differences between descriptive and inferential statistics.
- Define discrete variable with an example.

3. Write short answers of any EIGHT parts.

16

- Write a note on two way classification.
- Differentiate between ungrouped and grouped data.
- Describe the main parts of a table.
- What are the raw moments?
- Find the range of: -1, -4, 0, 7, 4
- Compute the value of σ_y if $Y = 3X + 10$ and $V(X) = 2$
- Define the mesokurtic distribution.
- Give any two properties of the mean deviation.
- Verify that: ${}^{10}C_4 = {}^{10}C_6$
- State the addition law of probability.
- Differentiate between mutually and not mutually exclusive events.
- Find $P\left(\frac{B}{A}\right)$ so that $P(A \cap B) = 0.25$ and $P(A) = 0.75$.

4. Write short answers of any SIX parts.

12

- What is difference between discrete and continuous random variables?
- Define probability density function and write its properties.
- If $E(X) = 3$ and Variance $(X) = 1.2$ find $E(2X - 1)$ and $\text{Var}(2X - 1)$
- For a binomial distribution $n = 10$ and $p = 0.7$. Find $P(X = 7)$
- Given $f(x) = \frac{k}{x}$ for $x = 1, 2, 3$. Find k .
- Explain what is meant by Bernoulli trials.
- Explain and write the formula for hypergeometric distribution.
- Find $P(X = 0)$ for hypergeometric distribution with $n = 4$, $N = 10$ and $K = 3$.
- Point out the fallacy if any if mean of a binomial distribution is 5 and its standard deviation is 3.

SECTION – II Attempt any THREE questions. Each question carries 08 marks.**5. (a) Find arithmetic mean for the given data:**

04

| Marks | 10 – 14 | 15 – 19 | 20 – 24 | 25 – 29 | 30 – 34 |
|-------|---------|---------|---------|---------|---------|
| f | 8 | 10 | 15 | 7 | 4 |

(b) Find geometric mean from the following frequency distribution:

04

| X | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| f | 5 | 7 | 8 | 3 | 2 |

(Continued P 2)

6. (a) Calculate variance for the marks of 100 students given in the following frequency distribution:

| Marks | 1 – 3 | 3 – 5 | 5 – 7 | 7 – 9 |
|-------|-------|-------|-------|-------|
| f | 40 | 30 | 20 | 10 |

- (b) First three moments of distribution about $Y = 2$ are 1, 2.5 and 5.5. Calculate mean and co-efficient of variation.

7. (a) Compute index number of prices for the following data taking 2000 as base year using median as an average:

| Years | Prices | | |
|-------|--------|----|----|
| | A | B | C |
| 2000 | 18 | 85 | 52 |
| 2001 | 22 | 76 | 60 |
| 2002 | 28 | 80 | 66 |
| 2003 | 31 | 95 | 80 |

- (b) If $P(A) = 0.60$, $P(B) = 0.08$ and $P(A \cap B) = 0.01$, calculate $P(A \cup B)$ if:

- (i) A and B are not mutually exclusive (ii) A and B are mutually exclusive

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

| x | 1 | 2 | 3 | 4 | 5 |
|------|-------|-------|-------|-------|-------|
| f(x) | 0.125 | 0.450 | 0.250 | 0.050 | 0.125 |

Find mean and variance.

- (b) A continuous random variable X having values only between 0 and 4 has a density function given by:

$$f(x) = \frac{1}{2} - ax, \text{ where "a" is any constant: Find (i) a (ii) } P(1 < X < 2)$$

9. (a) An event has the probability $P = \frac{2}{5}$. Find the complete binomial distribution for $n = 5$ trials.

- (b) An urn contains nine balls. Five of them are red and four blue. Three balls are drawn without replacement. Find the probability distribution for number of red balls.

1119-XI124-5000

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Faisalabad Board-2023

Roll No. : _____

Objective
Paper Code
6183

Intermediate Part First
STATISTICS (Objective)
 Time: 20 Minutes Marks: 17



Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

| S.# | Questions | A | B | C | D |
|-----|---|----------------------------|-----------------------------|-----------------------------|---------------------|
| 1 | In hypergeometric experiment, total number of successes are denoted by: | n | k | N | N-k |
| 2 | The mean and S.D of binomial distribution will be: | np and npq | np and nq | np and \sqrt{np} | np and \sqrt{npq} |
| 3 | In a binomial distribution, if $P = 0.6$, then distribution will be: | Symmetrical | Negatively skewed | Positively skewed | All these |
| 4 | The S.D of a random variable X is given by: | $\sqrt{E(X^2) - (E(X))^2}$ | $\sqrt{E(X^2) + (E(X))^2}$ | $E(X^2) - (E(X))^2$ | $E(X^2) - E(X)$ |
| 5 | If $P(X) = \frac{1}{10}$ and $X=100$, then $E(X)$ is: | 1 | 10 | 100 | Zero |
| 6 | If A and B are dependent events, then $P(A \cap B)$ is: | $P(A) \cdot P(B)$ | $P(A) \cdot P(\frac{B}{A})$ | $P(A) \cdot P(\frac{A}{B})$ | Both "B" and "C" |
| 7 | The probability of selecting a red ball from a bag containing 100 red balls is: | Zero | 1 | $\frac{1}{100}$ | $\frac{2}{100}$ |
| 8 | If $\sum p_n q_0 = 400$, $\sum p_0 q_0 = 200$, then Laspeyre's index is: | 400 | 200 | 100 | 140 |
| 9 | The index $\frac{\sum p_n}{\sum p_0} \times 100$ is called: | Chain index | Weighted index | Simple aggregative index | Link relative |
| 10 | First moment about mean is always equal to: | Zero | S.D | Variance | A.M |
| 11 | The value of mean deviation is minimum if the deviations are taken from: | A.M | G.M | Mode | Median |
| 12 | If $S.D(X) = 2$, then $S.D(X+12)$ will be: | 14 | 12 | 2 | 4 |
| 13 | The G.M of two values a and b is: | $\frac{a+b}{2}$ | \sqrt{ab} | $\frac{2ab}{a+b}$ | $\frac{a+b}{2ab}$ |
| 14 | Which is affected by extreme values: | Quartile | Median | Mode | A.M |
| 15 | The quartiles are the values which divides an arrayed set of data into equal parts: | 4 | 2 | 10 | 100 |
| 16 | Class mark of the class 65 – 84 is: | 74 | 75 | 75.5 | 74.5 |
| 17 | The life of T.V. tube is an example of: | Discrete variable | Continuous variable | Qualitative variable | Constant |

1119-XI123-4000

SECTION – I

2. Write short answers of any EIGHT parts.

16

- (i) Define statistics. (ii) What is difference between constant and variable?
 (iii) Define mode. (iv) Define weighted mean.
 (v) Define quartiles. (vi) What is the relation between AM, GM and HM?
 (vii) Write any two merits of median. (viii) Define link relatives.
 (ix) What is composite index number? (x) What is CPI?
 (xi) The sum of deviations of 15 values from 20 is 45. Find arithmetic mean.
 (xii) If Laspeyre's index number = 105.4 and Paasche's index number = 103.5, find Fisher's index.

3. Write short answers of any EIGHT parts.

16

- (i) Define classification. (ii) What is meant by class interval?
 (iii) Find the range of -1, -3, 0, 2 and 3. (iv) Define kurtosis.
 (v) Define coefficient of variation. (vi) Define sample space.
 (vii) Write any two properties of variance. (viii) What is conditional probability?
 (ix) What is meant by mutually exclusive events?
 (x) Write different methods of measuring absolute dispersion.
 (xi) Given that $\bar{x} = 200$ and $CV = 7$, then find the value of variance.
 (xii) State addition law of probability for mutually exclusive events.

Write short answers of any SIX parts.

12

- (i) Define discrete random variable. (ii) Define probability density function.
 (iii) If $E(X) = 7$, $E(X^2) = 54.83$, find $Var(X)$. (iv) Define continuous random variable.
 (v) Define trial. (vi) What is Bernoulli's trial?
 (vii) If $n = 4$, $P = \frac{1}{2}$ find $P(X = 3)$ (viii) What is hypergeometric experiment?
 (ix) When binomial distribution is negatively skewed?

SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) Compute P_3 and mode from the following data:

04

| Classes | 2 – 4 | 4 – 6 | 6 – 8 | 8 – 10 | 10 – 12 |
|---------|-------|-------|-------|--------|---------|
| f | 2 | 10 | 12 | 8 | 4 |

(b) The frequency distribution given below has been derived from the use of working origin.

If $D = X - 18$, Compute geometric mean:

04

| D | -12 | -8 | -4 | 0 | 4 | 8 | 12 | 16 |
|---|-----|----|----|----|----|----|----|----|
| f | 2 | 5 | 8 | 18 | 22 | 13 | 8 | 4 |

6. (a) Calculate standard deviation from the following frequency distribution:

04

| Wages | 30 – 35 | 35 – 40 | 40 – 45 | 45 – 50 | 50 – 55 |
|-----------|---------|---------|---------|---------|---------|
| frequency | 12 | 18 | 32 | 16 | 8 |

(b) Compute first three moments about mean for the following set of examination marks:

45, 32, 37, 46, 39, 36, 41, 48 and 36.

04

7. (a) Compute chain indices for the following data taking 2009 as base year:

04

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------|------|------|------|------|------|------|------|
| Prices | 1800 | 1850 | 1940 | 2000 | 2040 | 2180 | 2200 |

(b) Two cards are drawn from a well-shuffled pack of 52 cards. Find the probability that:

- (i) One is king and other is queen (ii) Both are of different colours?

04

8. (a) Find the missing probability from the given probability distribution of X:

04

| X | 2 | 3 | 4 | 5 | 6 |
|------|------|------|------|---|------|
| f(x) | 0.01 | 0.25 | 0.40 | A | 0.20 |

Also find $Var(X)$

(b) A continuous random variable X has a probability density function:

$$f(x) = \frac{x+1}{8} \text{ for } x = 2 \text{ to } x = 4. \text{ Find } P(2.4 < X < 3.5)$$

04

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) None is defective (ii) 2 bolts are defective

04

(b) A committee of size 5 is to be selected at random from 3 women and 5 men. Find mean number of women on committee.

04

Faisalabad Board-2022



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STATISTICS (Objective)

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Q.No.1

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| S.# | Questions | A | B | C | D |
|-----|--|------------------------|-------------------|--------------------|-------------------|
| 1 | If \bar{x} = mean = 50 and standard deviation = $S = 9$, then coefficient of variation will be: | 28 % | 18 % | 10 % | None of these |
| 2 | If there is no variation in data, then the standard deviation is: | Large | Zero | Small | Negative |
| 3 | The mean of two numbers 2 and 8 is 5. Then their median will be: | 5 | 3 | 1 | None of these |
| 4 | Which is least if $\bar{x} = 100$: | $\sum(x - 200)^2$ | $\sum(x - 100)^2$ | $\sum(x - 50)^2$ | $\sum(x - 150)^2$ |
| 5 | The sum of deviations is zero, when the deviations are taken from: | Mean | Median | Mode | Geometric mean |
| 6 | Histogram is a graph of : | Frequency distribution | Time series | Qualitative data | None of these |
| 7 | In a relative frequency distribution, the total of relative frequency is: | 100 | One | Undefined | None of these |
| 8 | The word Statistics came from the Latin word: | Status | Statistik | Statista | Statistique |
| 9 | Hypergeometric distribution has: | One parameter | Two parameters | Three parameters | No parameter |
| 10 | The binomial distribution is negatively skewed if: | $p = 0$ | $p > \frac{1}{2}$ | $p < \frac{1}{2}$ | $p = \frac{1}{2}$ |
| 11 | An expected value of a random variable is equal to: | Mean | Variance | Standard deviation | None of these |
| 12 | Total area under the curve of a continuous probability distribution is equal to: | Zero | One | 0.5 | -1 |
| 13 | Two events A and B are called mutually exclusive if: | $A \cup B = S$ | $A \cap B = \phi$ | $A \cap B = S$ | $A \cap B = 0$ |
| 14 | The term sample space is used for: | All possible outcomes | Few outcomes | Dispersion | None of these |
| 15 | If Laspeyre's index = 119.89 and Paasche's index = 119.65. Fisher index will be: | 119.67 | 119.86 | 119.77 | 119.07 |
| 16 | In chain base method, the base period is: | Fixed | Constant | Not fixed | None of these |
| 17 | The value of standard deviation changes by the change of: | Origin | Scale | Algebraic signs | None of these |

17-XI122-3500



STATISTICS (Subjective)

Time: 02:40 Hours

Marks: 68

SECTION – I

2. Write short answers of any EIGHT parts.

16

- Define statistics.
- Differentiate between sample and population.
- Write at least two properties of an ideal average.
- State any two properties of arithmetic mean.
- What is the relation between A.M, G.M and H.M?
- A person spent Rs. 6000 for purchase of 10 items. What is the average price per item?
- If $x = 1, 3$ and 9 . Find G.M.
- If sum of deviations from 2250 for 5 different values is 500. Find mean.
- Write a short note on consumers price index.
- Narrate at least two uses of index numbers.
- Compare simple index numbers with composite index numbers.
- Define weighted index number.

3. Write short answers of any EIGHT parts.

16

- What is the class interval?
- Define the relative frequency.
- If $Q_1 = 88.03$ and $Q_3 = 94.90$ find coefficient of quartile deviation.
- Differentiate between relative and absolute dispersion.
- Write the properties of mean deviation.
- What is kurtosis? Relate with S.D.
- Distinguish between positively and negatively skewed distribution.
- Define moments about mean with application.
- What are the equally likely events?
- Differentiate between permutation and combination.
- A fair coin is tossed, find the probability of tail.
- What is the classical definition of probability?

4. Write short answers of any SIX parts.

12

- Define probability distribution.
- Explain giving examples the concept of random variable.
- What are properties of probability density function.
- Given $E(X) = 1.1$ and $E(X^2) = 2.1$, find $\text{Var}(X)$.
- Define variance of the discrete random variable.
- State the formula used to calculate binomial probabilities.
- Write properties of hypergeometric experiment.
- In binomial distribution mean = 6 and variance = 2.4. Find its parameters.
- What are the parameters of hypergeometric distribution?

SECTION – II

Attempt any THREE questions. Each question carries 08 marks.

5. (a) Find A.M. Given that (i) $\frac{D = X - 20}{\sum f D = 150}$, $n = 25$ (ii) $u = \frac{x - 124.5}{3}$, $\sum f u = 50$, $n = 150$

04

(b) Find lower quartile and 44th percentile from the following data given below:

04

| Marks | 40 – 49 | 50 – 59 | 60 – 69 | 70 – 79 | 80 – 89 |
|-------|---------|---------|---------|---------|---------|
| f | 3 | 11 | 21 | 30 | 24 |

6. (a) Calculate the first four moments about the mean for the following set of marks obtained in the examinations: 45, 32, 37, 46, 39, 36, 48, 37

04

- (b) By multiplying each number 3, 6, 1, 7, 2 and 5 by 2 and then adding 5, we obtained 11, 17, 7, 19, 9 and 15. By computing variances of both sets, establish relationship between variances so obtained.

04

(Continued P/2)

7. (a) Find cost of living index number for 2012. Use 2011 as base year:

04

| Expenses on | Food 35 % | Rent 15 % | Clothing 20 % | Fuel 10 % | Misc. 20 % |
|--------------|-----------|-----------|---------------|-----------|------------|
| Price (2011) | 150 | 30 | 75 | 25 | 10 |
| Price (2012) | 145 | 30 | 65 | 23 | 15 |

Also interpret.

- (b) If two fair dice are thrown, what is the probability of getting:

(i) a double six (ii) a sum of 8 or more dots?

04

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

04

| X | 1 | 2 | 3 | 4 | 5 |
|--------|-----|-----|-----|-----|-----|
| $f(x)$ | 0.1 | 0.2 | 0.3 | 0.3 | 0.1 |

Show that $E(2X + 8) = 2E(X) + 8$

- (b) A continuous random variable X that can assume values between $X = 2$ and $X = 5$ has a density

function given by $f(x) = \frac{2}{27}(X+1)$ find (i) $P(X < 4)$ (ii) $P(3 < X < 4)$

04

9. (a) A fair coin is tossed 5 times. What is the probability of getting:

(i) exactly 3 heads (ii) at least 3 heads?

04

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

04

17-XI122-3500

Objective

Intermediate Part First (New Scheme)

Paper Code

STATISTICS (Objective)

6187

Time: 20 Minutes

Marks: 17



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| S.# | Questions | A | B | C | D |
|-----|--|---------------|------------|-------------------|-------------------|
| 1 | The variance of 7, 7, 7, 7, 7, is: | 7 | $(7)^2$ | 0 | -7 |
| 2 | Mean deviation from median is: | Least | Most | Equal | None of these |
| 3 | Measures of dispersion has _____ types. | 2 | 3 | 4 | 5 |
| 4 | If $a = 90$, $\sum d = 2$ and $n = 10$, then \bar{x} is: | 90.10 | 90.15 | 90.20 | 90.25 |
| 5 | G.M. of numbers 0, 1, 2, 5, 9 is: | 2 | 9 | 0 | 1 |
| 6 | Sum of deviations of the values from mean is always: | Negative | Positive | Zero | Fractional |
| 7 | The process of arranging data into rows and columns is called: | Presentation | Tabulation | Classification | Arranging of data |
| 8 | There are bases for classification: | 2 | 3 | 4 | 5 |
| 9 | Primary data and secondary data are: | Same | Different | Opposite | None of these |
| 10 | Hypergeometric distribution has parameters: | Two | Three | Four | Five |
| 11 | The probability of success is denoted by: | $1 + p$ | q | p | $1 - p$ |
| 12 | 000 – 999 are called random numbers of: | 1-digit | 2-digits | 3-digits | 4-digits |
| 13 | $E(XY)$ is equal to: | $E(X) + E(Y)$ | $XE(Y)$ | $E(X) \cdot E(Y)$ | $YE(X)$ |
| 14 | Any subset of the sample space is called: | Event | Sample | Outcome | Point |
| 15 | The probability of sure event is: | 0 | -1 | 1 | < 1 |
| 16 | In chain base method, base period is: | Fixed | Changed | Constant | None of these |
| 17 | If all the values are of equal importance then index numbers are called: | Simple | Weighted | Unweighted | None of these |

16-XI119-5000

SECTION – I

2. Write short answers of any EIGHT parts.

16

- Define discrete variable
- Expand $\sum_{i=1}^n (y_i - \mu)$ and $\sum_{i=1}^n (y_i)$
- Define weighted arithmetic mean.
- If $\bar{y}_1 = 3$ with $n_1 = 3$ and $\bar{y}_2 = 4$ with $n_2 = 2$, then find \bar{y}_c
- What are merits of mode?
- What are demerits of geometric mean?
- Illustrate graphically the relative positions of the mean, median and mode for frequency curves which are skewed to right and left.
- Define price relatives.
- Define simple index number.
- What is consumer price index number?
- Find Fisher's index number if Laspeyres' = 108.78 and Paasche's = 109.21
- What are limitations of an index number?

3. Write short answers of any EIGHT parts.

16

- What is classification?
- Define class boundaries.
- What is meant by dispersion?
- Define standard deviation.
- Write any two properties of standard deviation.
- Compute coefficient of quartile deviation if $Q_1 = 10.29$, $Q_3 = 58.29$
- Calculate lower quartile from the given data: 16, 3, 7, 15, 17, 5, 23, 27
- Define event.
- Define compound event.
- Define non-mutually exclusive events.
- Define exhaustive events.
- For two mutually exclusive events A and B if $P(A) = 0.25$, $P(B) = 0.40$, then find $P(A \cup B)$.

4. Write short answers of any SIX parts.

12

- What do you understand by random numbers?
- Define mathematical expectations.
- Given $E(X) = 200$, $C.V(X) = 7$, then find $\text{Var}(X)$.
- What is continuous random variable?
- Write any two properties of expectation.
- What is Bernoulli's trial?
- Find the number of trials of a binomial distribution which has mean = 12, S.D = 2
- Under which circumstances we can apply the binomial distribution and hypergeometric distribution?
- Given $N = 10$, $n = 4$ and $K = 5$. Find $P(X = 1)$.

SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) Find the weighted mean if weights 4, 3, 3, 2 and 2 respectively are allotted to the subjects:

04

| Subjects | Urdu | English | Math | Statistics | Physics |
|----------|------|---------|------|------------|---------|
| Marks | 82 | 73 | 80 | 57 | 62 |

(b) Calculate harmonic mean from the following distribution:

04

| Classes | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 |
|-----------|---------|---------|---------|---------|---------|
| Frequency | 3 | 5 | 12 | 6 | 4 |

6. (a) Find the coefficient of quartile deviation from the following data:

04

| Classes | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 |
|-----------|---------|---------|---------|---------|---------|
| Frequency | 3 | 7 | 10 | 8 | 2 |

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

04

(Continued P/2)

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Paper Code

Intermediate Part First (New Scheme)
STATISTICS (Objective)



6181

Time: 20 Minutes

Marks: 17

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| S.# | Questions | A | B | C | D |
|-----|---|---------------------|--------------------------------------|--------------------------------------|---|
| 1 | Height of a plant is _____ variable. | Qualitative | Discrete | Continuous | Attribute |
| 2 | In histogram, along x-axis we take: | Mid points | Frequency | Cumulative frequency | Class boundaries |
| 3 | Part of the table containing row captions are called: | Stub | Box heads | Body | Foot notes |
| 4 | $\Sigma(y - \bar{y})^2 = :$ | Least | Maximum | 0 | 1 |
| 5 | For averaging percentages, the useful average is: | Arithmetic mean | Median | Mode | Geometric mean |
| 6 | For positively skewed distribution: | Mean > median | Mean < median | Mean < mode | Median < mode |
| 7 | Moment ratio b_2 is defined as: | $\frac{m_3}{m_2^3}$ | $\frac{m_3}{\sqrt{m_2^3}}$ | $\frac{m_4}{m_2^2}$ | $\frac{m_2^2}{m_4}$ |
| 8 | $\text{Var}(ay) = :$ | $a \text{ Var}(y)$ | $a^2 \text{ Var}(y)$ | $ a \text{ Var}(y)$ | $\frac{1}{a} \text{ Var}(y)$ |
| 9 | Second moment about mean is: | 0 | Mean | Variance | SD |
| 10 | In price relatives, the given year price is divided by the price of: | First year | Last year | Preceding year | Base year |
| 11 | Fisher's index number is _____ of the Laspeyres and Paasche's index number. | AM | GM | HM | Median |
| 12 | If A and B are independent events then $P(A \cap B) = :$ | 0 | 1 | $P(A)P(B)$ | $P(A) P(B/A)$ |
| 13 | If a coin is tossed four times, the number of total sample points will be: | 4 | 8 | 16 | 2 |
| 14 | If d and b are constant and y is a random variable, then $E(by + d) = :$ | $b E(y) + d$ | $b E(y)$ | $E(y) + d$ | $E(y)$ |
| 15 | If x is a random variable then $\text{Var}(x) = :$ | $E[x - E(x)]$ | $E[x^2 - E(x)]$ | $E[x - E(x)]^2$ | $E[x^2 - (E(x))^2]$ |
| 16 | Parameters of binomial distribution are: | n and q | n and p | p and q | n, p and q |
| 17 | Variance of hyper-geometric distribution is: | $\frac{nN}{k}$ | $\frac{Nk}{n} \cdot \frac{N-1}{N-n}$ | $\frac{N}{nk} \cdot \frac{N-n}{N-1}$ | $\left(\frac{nk}{N}\right) \left(\frac{N-k}{N}\right) \left(\frac{N-n}{N-1}\right)$ |

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SECTION – I

2. Write short answers of any EIGHT parts.

16

- (i) Define the term population.
- (ii) Enlist three main methods of collection of primary data.
- (iii) Define geometric mean.
- (iv) What are two merits of arithmetic mean?
- (v) Write the empirical relationship between mean, median and mode.
- (vi) Given $\bar{x}_1 = 4$, $\bar{x}_2 = 5$ and $\bar{x}_3 = 7$ and each mean is based on six values. Compute combined mean.
- (vii) If $x_1 = 2$ and $x_2 = 8$, then show that A.M. > G.M. > H.M.
- (viii) Define price index number.
- (ix) What are two important uses of index numbers.
- (x) Explain chain base method.
- (xi) Given $\sum p_0 q_n = 950$ and $\sum p_n q_n = 1310$. Find current year weighted index number.
- (xii) Given $\sum p_0 = 660$, $\sum p_1 = 924$ and $\sum p_2 = 1056$. Compute simple aggregative index numbers.

3. Write short answers of any EIGHT parts.

16

- (i) What is frequency polygon?
- (ii) Differentiate between class mark and class width.
- (iii) Define quartile deviation.
- (iv) Differentiate between absolute and relative measures of dispersion.
- (v) If $n = 10$, $\sum x = 40$ and $S = 2$ then find coefficient of variation.
- (vi) Define kurtosis.
- (vii) If $Q_1 = 10$, $Q_2 = 20$ and $Q_3 = 30$, find coefficient of skewness.
- (viii) Define independent and dependent events.
- (ix) What is conditional probability.
- (x) State addition law of probability for non-mutually exclusive events.
- (xi) What is meant by sample space?
- (xii) Differentiate between simple and compound events.

4. Write short answers of any SIX parts.

12

- (i) Define a continuous random variable.
- (ii) What are the expectation and standard deviation of a constant?
- (iii) Given $x = 0, 1, 2$ and $P(x) = \frac{5}{8}, \frac{4}{8}, \frac{1}{8}$. Is this a probability function?
- (iv) Find the mean for the given discrete distribution, $f(x) = \frac{1}{3}$ and $\frac{2}{3}$ with $x = 5$ and 6 .
- (v) A continuous random variable x has a density function $f(x) = \frac{cx}{4}$ for $1 \leq x \leq 4$. Find the value of c .
- (vi) Write the properties of binomial experiment.
- (vii) For a binomial distribution with $n = 10$ and $p = 0.5$. Find the probability of 5 successes.
- (viii) Write the parameters of hypergeometric distribution.
- (ix) Given $N = 10$, $n = 4$ and $k = 3$. Find $P(x = 1)$.

SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) Find the mean from the following distribution:

04

| Classes | 0 – 10 | 10 – 40 | 40 – 90 | 90 – 100 | 100 – 105 | 105 – 120 | 120 – 140 |
|-----------|--------|---------|---------|----------|-----------|-----------|-----------|
| Frequency | 40 | 110 | 150 | 200 | 120 | 30 | 20 |

(b) Find the geometric mean of 50, 67, 39, 40, 36. Also find harmonic mean of these numbers.

04

(Continued P/2)

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6. (a) The following table given the marks of students:

04

| Marks | 30 – 39 | 40 – 49 | 50 – 59 | 60 – 69 | 70 – 79 |
|-----------|---------|---------|---------|---------|---------|
| Frequency | 4 | 40 | 90 | 38 | 10 |

Calculate quartile deviation and coefficient of quartile deviation.

- (b) For the following frequency distribution, calculate coefficient of variation:

04

| D | -6 | -3 | 0 | 3 | 6 |
|-----------|----|----|----|----|---|
| Frequency | 5 | 18 | 42 | 27 | 8 |

Where $D = x - 67$.

7. (a) Compute chain indices using median as an average:

04



| Years | Commodities | | |
|-------|-------------|-----|-----|
| | A | B | C |
| 2008 | 118 | 190 | 150 |
| 2009 | 122 | 172 | 160 |
| 2010 | 130 | 180 | 170 |
| 2011 | 135 | 135 | 180 |

- (b) A digit is selected at random from the first ten natural numbers. Find the probability that the selected digit is (i) an odd (ii) less than 5.

04

8. (a) Determine the constant K in the probability function:

04

$f(x) = K(x - 2)$ $x = 3, 4, 5, 6$ Find (i) the value of K (ii) $E(x)$

- (b) A continuous random variable 'X' has a probability density function, $f(x) = 2x$ when $0 \leq X \leq 1$

find (i) $P\left(X \leq \frac{1}{2}\right)$ (ii) $P\left(\frac{1}{4} \leq X \leq \frac{1}{2}\right)$

04

9. (a) In binomial distribution with $n = 6$, what is value of other parameter of the binomial distribution if $P(X = 0) = P(X = 1)$. Also find mean of the distribution.

04

- (b) Determine the probability distribution for the number of white beads among 5 beads drawn at random from a box containing 5 white and 8 black beads.

04

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