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HSSC-I

Statistics Guess paper 1

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FBISE HSSC-I Statistics

COMPREHENSIVE GUESS PAPER

Annual Examination 2026

Marks: 85+15=100

HSSC-I (Part-I)

Board	Federal Board of Intermediate & Secondary Education (FBISE)
Class	HSSC-I (Part-I) Subject: Statistics Marks: 85+15=100
Textbook	Dr. Afzal Beg's Statistics for HSSC-I
Coverage	8 Chapters (Excluding Probability & Probability Distributions)
Sections	1. Exam Analysis 2. Chapter-wise Guess 3. Top 30 Questions 4. Model Paper 5. Solved Numericals 6. Predictions 7. Revision Sheet

Prepared by an Examiner with 20+ Years of FBISE Experience

Disclaimer: Based on analysis of past FBISE patterns & syllabus weightage. A study aid, not a guarantee.
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1.1 Chapter Weightage, High-Scoring Topics & Common Mistakes

Chapter	Weight	High-Scoring Topics	Commonly Missed Concepts
1. Intro to Statistics	0.5/8	Definitions, population vs sample	Types of data, parameter vs statistic
2. Presentation of Data	0.5/8	Frequency distribution, pie chart	Class boundary vs class limit, ogive
3. Measures of Location	1/8	AM (grouped), GM, median, quartiles	Change of origin/scale, $AM \geq GM \geq HM$
4. Measures of Dispersion	1/8	Variance, SD, CV, mean deviation	Empirical rule, skewness/kurtosis concepts
5. Index Numbers	1/8	Laspeyres, Fisher, chain-base, CPI	Weighted vs unweighted, Fisher = GM of L&P
6. Correlation	0.5/8	Karl Pearson r, scatter diagram	Properties of r, r = GM of regression coeff
7. Regression	0.5/8	Regression equations, estimation	Two lines intersect at (X-bar, Y-bar)
8. Time Series	1/8	Least squares trend, moving averages	Quadratic trend, signal vs noise

Key Insight: Chapters 3 & 4 (Location & Dispersion) carry the highest weightage ($2/8 = 25\%$). They consistently produce the most numerical questions. Index Numbers, Time Series, and Correlation/Regression are reliable sources of long questions.

Most important definitions, theory, numericals, and expected 2026 questions per chapter. **VIP** = highest priority.

Chapters 1-2: Introduction & Presentation of Data

Definitions	Statistics; Population vs Sample; Census vs Sample Survey; Parameter vs Statistic; Frequency distribution; Class interval/boundary/limit; Cumulative frequency (ogive); Pie chart
Theory VIP	Scope & importance of statistics in various fields; Types of frequency distributions; Construction of frequency distribution; Types of bar charts; Pie chart construction
Numericals VIP	Construct frequency distribution from raw data; Draw histogram; Draw pie chart; Construct cumulative frequency table
Expected 2026 VIP	Construct frequency distribution table from raw data and draw histogram; Explain types of bar charts; When is pie chart preferred?

Chapter 3: Measures of Location

Definitions	Measures of central tendency; AM & its properties; GM & HM; Median; Quantiles (Q,D,P); Mode; Weighted AM
Theory VIP	Properties of AM; Computation of AM by direct/origin/scale methods; $AM \geq GM \geq HM$ relationship; Graphical method for median & quantiles; Merits/demerits of median vs mean
Numericals VIP	AM from grouped data (direct & shortcut); Median from frequency distribution; Q1, Q3, D6, P70; Geometric mean using logs; Mode = $3\text{Median} - 2\text{Mean}$
Expected 2026 VIP	Calculate AM using change of origin/scale; Find median, Q1, Q3 from grouped data; Calculate GM using logarithms

Chapter 4: Measures of Dispersion

Definitions	Dispersion; Absolute vs relative measures; Range; QD; Mean deviation; Variance & SD; CV; Skewness; Kurtosis
Theory VIP	Properties of variance; Computation by direct/origin/scale; Absolute vs relative measures; Empirical rule (68-95-99.7); CV & its use; Moments; Skewness & kurtosis diagrams
Numericals VIP	Variance & SD from grouped data; SD by change of origin; CV comparison of two groups; Mean deviation from mean/median; QD & its coefficient
Expected 2026 VIP	Calculate SD using change of origin method; Calculate CV for two groups - which is more consistent?; Calculate mean deviation from mean

Chapter 5: Index Numbers

Definitions	Index numbers; Price/quantity index; Fixed-base vs chain-base; Laspeyres; Paasche; Fisher; CPI; WPI
Theory VIP	Steps in constructing price index numbers; Laspeyres/Paasche/Fisher formulas & limitations; Chain vs fixed base; CPI construction in Pakistan; Fisher = GM of L&P
Numericals VIP	Fixed-base price index; Laspeyres index; Fisher's ideal index; Chain-base index; Paasche index
Expected 2026 VIP	Calculate Laspeyres, Paasche & Fisher indices - which is preferred?; Construct chain-base index; Explain CPI construction in Pakistan

Chapters 6-7: Correlation & Regression

Definitions	Bivariate data; Scatter diagram; Correlation types; Karl Pearson r; Spearman rank r; Regression; Least-squares; Regression coefficients
Theory VIP	Properties of r (range -1 to +1, $r_{xy} = r_{yx}$, unaffected by origin/scale); $r = GM$ of regression coefficients; Normal equations derivation; Two regression lines intersect at $(\bar{X}, \bar{Y})$; Correlation vs regression
Numericals VIP	Karl Pearson r from bivariate data; Spearman rank correlation; Regression Y on X & estimate; Both regression equations & intersection; Verify $r = \sqrt{b_{xy} \times b_{yx}}$
Expected 2026 VIP	Calculate Karl Pearson r & interpret; Find two regression equations, estimate Y when X=15 & X when Y=20; Derive normal equations for regression line

Chapter 8: Time Series Analysis

Definitions	Time series; Components (trend, seasonal, cyclical, irregular); Signal & noise; Moving average; Semi-averages; Freehand; Least-squares
Theory VIP	Four components with diagrams; Moving average method; Semi-averages method; Least-squares (linear & quadratic); Advantages & limitations of each method
Numericals VIP	Linear trend by least squares & estimate future; 3-year & 5-year moving averages; Semi-averages trend; Quadratic trend fitting
Expected 2026 VIP	Fit linear trend by least squares, estimate for 2028; Calculate 3-yearly & 5-yearly moving averages; Explain four components of time series

3 TOP 30 MOST EXPECTED QUESTIONS FOR 2026

Ranked by probability. Ranks 1-10 have the highest likelihood of appearing in 2026.

1. Calculate AM from grouped data (change of origin/scale) [Loc] **Long**
2. Calculate variance & SD from frequency distribution [Disp] **Long**
3. Calculate Karl Pearson's coefficient of correlation [Corr] **Long**
4. Find regression equation Y on X & estimate Y [Reg] **Long**
5. Fit linear trend by least squares, estimate future [TS] **Long**
6. Calculate Laspeyres' & Fisher's price index numbers [IN] **Long**
7. Calculate CV for two groups, determine consistency [Disp] **Long**
8. Find median, Q1, Q3 from grouped data [Loc] **Long**
9. Calculate Spearman's rank correlation coefficient [Corr] **Long**
10. Find both regression equations & intersection [Reg] **Long**
11. Calculate 3-year & 5-year moving averages [TS] **Long**
12. Construct frequency distribution from raw data [Pres] **Short**
13. State properties of arithmetic mean [Loc] **Short**
14. State properties of variance [Disp] **Short**
15. Explain components of a time series [TS] **Short**
16. Define index numbers & steps in construction [IN] **Short**
17. Differentiate between population and sample [Intro] **Short**
18. State properties of correlation coefficient (r) [Corr] **Short**
19. Explain CPI construction in Pakistan [IN] **Short**
20. Calculate mean deviation from mean/median [Disp] **Short**
21. Calculate geometric mean using logarithms [Loc] **Short**
22. Differentiate fixed-base & chain-base methods [IN] **Short**
23. Explain scatter diagram & types of correlation [Corr] **Short**
24. Define skewness & kurtosis with diagrams [Disp] **Short**
25. Explain least-squares method for trend fitting [TS] **Short**
26. State empirical relationship: mean, median, mode [Loc] **MCQ**
27. Range of r is -1 to +1 [Corr] **MCQ**
28. Fisher index = GM of Laspeyres & Paasche [IN] **MCQ**
29. Two regression lines intersect at (X-bar, Y-bar) [Reg] **MCQ**
30. If all values equal, SD = 0 [Disp] **MCQ**

Federal Board HSSC-I Statistics | Annual 2026 | Marks: 85 | Time: 3 Hours
Attempt all Section-A, any 12 from Section-B, any 5 from Section-C.

SECTION-A (MCQs - 25 Marks)

- Q1.** Statistics is the science of: (a) counting (b) averages (c) collecting & interpreting data (d) probability
- Q2.** Sum of deviations from AM is always: (a) Zero (b) Positive (c) Negative (d) One
- Q3.** Geometric mean of 4 and 9 is: (a) 6 (b) 6.5 (c) 5 (d) 36
- Q4.** Most affected by extreme values: (a) Median (b) Mode (c) AM (d) QD
- Q5.** AM, GM, HM relationship: (a) $AM \leq GM \leq HM$ (b) $AM \geq GM \geq HM$ (c) $AM = GM = HM$ (d) $GM \geq AM \geq HM$
- Q6.** CV is a: (a) Absolute measure (b) Relative measure (c) Both (d) Neither
- Q7.** Mode = ? (a) $3\text{Median} - 2\text{Mean}$ (b) $2\text{Median} - 3\text{Mean}$ (c) $3\text{Mean} - 2\text{Median}$ (d) $2\text{Mean} - 3\text{Median}$
- Q8.** Variance is always: (a) Negative (b) Zero or positive (c) Positive only (d) Between 0-1
- Q9.** Range of r: (a) 0 to 1 (b) -1 to +1 (c) -inf to +inf (d) 0 to inf
- Q10.** If $r=0$, variables are: (a) Perfectly correlated (b) Negatively correlated (c) Uncorrelated (d) Positive
- Q11.** Two regression lines intersect at: (a) (0,0) (b) $(\bar{X}, \bar{Y})$ (c) (σ_x, σ_y) (d) (1,1)
- Q12.** r is GM of: (a) Two means (b) Two regression coeff (c) Two variances (d) Two SDs
- Q13.** Fisher's index is GM of: (a) Laspeyres & Paasche (b) Fixed & chain (c) CPI & WPI (d) Price & qty
- Q14.** In time series, time is: (a) Random (b) Non-random (c) Both (d) Neither
- Q15.** Four components of time series: (a) Mean, median, mode, range (b) Trend, seasonal, cyclical, irregular (c) Mean, var, SD, CV (d) Price, qty, value, index
- Q16.** Moving average measures: (a) Seasonal (b) Secular trend (c) Cyclical (d) Irregular
- Q17.** Pie chart represents: (a) Bars (b) Sectors of circle (c) Lines (d) Points
- Q18.** HM of 2 and 4 is: (a) 3 (b) $8/3$ (c) 6 (d) 2.5
- Q19.** NOT a measure of central tendency: (a) Mean (b) Median (c) SD (d) Mode
- Q20.** Coefficient of range: (a) $(L-S)/2$ (b) $(L-S)/(L+S)$ (c) $L-S$ (d) $(L+S)/(L-S)$
- Q21.** In symmetrical distribution, skewness is: (a) Positive (b) Negative (c) Zero (d) Undefined
- Q22.** Normal curve is: (a) Positively skewed (b) Negatively skewed (c) Symmetrical (d) Uniform
- Q23.** If all values equal, SD = (a) 1 (b) 0 (c) Mean (d) Undefined
- Q24.** CPI stands for: (a) Consumer Price Index (b) Cost Price Index (c) Commodity Price Index (d) Combined Price Index
- Q25.** Least-squares minimizes sum of: (a) Deviations (b) Squared deviations (c) Absolute deviations (d) Cubed deviations

ANSWER KEY: 1.C | 2.A | 3.A | 4.C | 5.B | 6.B | 7.A | 8.B | 9.B | 10.C | 11.B | 12.B | 13.A | 14.B | 15.B | 16.B | 17.B | 18.B | 19.C | 20.B | 21.C | 22.C | 23.B | 24.A | 25.B

SECTION-B (Short Questions - Attempt Any 12, 3 marks each = 36)

1. Differentiate between population and sample with examples.
2. Define primary and secondary data. State two sources of secondary data.
3. What is a frequency distribution? State its types.
4. Define class interval, class boundary, and class limit.
5. State four properties of the arithmetic mean.
6. State the empirical relationship between mean, median, and mode.
7. Define geometric mean. Where is it most appropriately used?
8. What is harmonic mean? Give formula for ungrouped data.
9. Define quartiles, deciles, and percentiles.
10. State four properties of variance.
11. Differentiate between absolute and relative measures of dispersion.
12. Define coefficient of variation. What is its practical use?
13. What is the empirical rule (68-95-99.7) for normal distribution?
14. Define index numbers. State two uses.
15. Differentiate between fixed-base and chain-base methods.
16. What is Fisher's ideal index? Why is it called 'ideal'?
17. Define CPI and WPI. State their importance in Pakistan.
18. Define bivariate data and scatter diagram.
19. State four properties of the correlation coefficient.
20. Define positive, negative, and zero correlation.

SECTION-C (Long Questions - Attempt Any 5, 8 marks each = 40)

1. Calculate AM from the following grouped data using change of origin/scale method. *[Location]*
2. Calculate variance, SD, and CV from the following frequency distribution. *[Dispersion]*
3. Calculate Karl Pearson's coefficient of correlation from the given bivariate data. *[Correlation]*
4. Find the two regression equations. Estimate Y when X=20 and X when Y=15. *[Regression]*
5. Fit a linear trend by least squares. Estimate trend value for 2028. *[Time Series]*
6. Calculate Laspeyres', Paasche's, and Fisher's price index numbers. *[Index Numbers]*
7. Calculate 3-yearly and 5-yearly moving averages for the given data. *[Time Series]*
8. Calculate median, Q1, and Q3 from the given grouped frequency distribution. *[Location]*
9. State and explain properties of AM. Explain change of origin/scale method. *[Location]*
10. Explain construction of price index numbers & CPI with reference to Pakistan. *[Index Numbers]*

5 MOST IMPORTANT NUMERICALS (SOLVED)

10 board-style numericals with complete solutions, formulas, and exam tips.

N1: Arithmetic Mean (Direct Method) VIP

Given: Classes: 0-10, 10-20, 20-30, 30-40, 40-50 | f: 5, 8, 15, 10, 7

$$\bar{x} = \frac{\sum fx}{\sum f}$$

Class	Mid(x)	f	fx
0-10	5	5	25
10-20	15	8	120
20-30	25	15	375
30-40	35	10	350
40-50	45	7	315
Total		$\sum f=45$	$\sum fx=1185$

$$\bar{x} = 1185/45 = 26.33$$

Tip: Always show midpoints. Verify $\sum f = n$ before dividing.

N2: AM by Change of Origin VIP

Given: Classes: 10-20, 20-30, 30-40, 40-50 | f: 4, 10, 12, 8 | A = 25

$$\bar{x} = A + \left(\frac{\sum fd}{\sum f} \right), d = x - A$$

Class	x	d=x-A	f	fd
10-20	15	-10	4	-40
20-30	25	0	10	0
30-40	35	10	12	120
40-50	45	20	8	160
Total			$\sum f=34$	$\sum fd=240$

$$\bar{x} = 25 + (240/34) = 25 + 7.06 = 32.06$$

Tip: Choose A as the midpoint of the middle class.

N3: Median from Grouped Data VIP

Given: n=50, Median class=20-30, cf(before)=15, f=20, h=10

$$\text{Median} = L + \left[\frac{(n/2 - cf)}{f} \right] \times h$$

$$\text{Median} = 20 + [(25-15)/20] \times 10 = 20 + 5 = 25.0$$

Tip: Find median class using $n/2$ and cumulative frequency.

N4: Quartiles Q1 and Q3 VIP

Given: n=80, Q1 class=10-20 (cf=10, f=20, h=10), Q3 class=30-40 (cf=55, f=15, h=10)

$$Q_k = L + \left[\frac{(kn/4 - cf)}{f} \right] \times h$$

$$Q1 = 10 + [(20-10)/20] \times 10 = 10 + 5 = 15.0$$

$$Q3 = 30 + [(60-55)/15] \times 10 = 30 + 3.33 = 33.33$$

Tip: For Q1 use $n/4$, for Q3 use $3n/4$.

N5: Variance & Standard Deviation VIP

Given: Classes: 0-10, 10-20, 20-30, 30-40 | f: 3, 5, 7, 5

$$S^2 = \left(\frac{\sum fx^2}{n} \right) - \bar{x}^2$$

x	f	fx	fx ²
5	3	15	75
15	5	75	1125

25	7	175	4375
35	5	175	6125
Total	20	440	11700

$$\bar{x} = 440/20 = 22 \mid s^2 = (11700/20) - (22)^2 = 585 - 484 = 101 \mid s = 10.05$$

Tip: Use shortcut formula to save time. Compute $\sum x^2$ column carefully.

N6: Coefficient of Variation Comparison VIP

Given: Group A: $\bar{x}=50$, $S=5$ | Group B: $\bar{x}=60$, $S=6$

$$CV = (S / \bar{x}) \times 100$$

$$CV(A) = (5/50) \times 100 = 10\% \mid CV(B) = (6/60) \times 100 = 10\%$$

Both groups have same CV. Both are equally consistent.

Tip: Lower CV = more consistent. Always state conclusion.

N7: Karl Pearson's Correlation VIP

Given: X: 1,2,3,4,5 | Y: 2,4,5,4,5

$$r = [\sum xy - n\bar{x}\bar{y}] / \sqrt{(\sum x^2 - n\bar{x}^2)(\sum y^2 - n\bar{y}^2)}$$

X	Y	XY	X ²	Y ²
1	2	2	1	4
2	4	8	4	16
3	5	15	9	25
4	4	16	16	16
5	5	25	25	25
Total	15	20	66	55

$$\bar{x}=3, \bar{y}=4 \mid \text{Num: } 66-60=6 \mid \text{Denom: } \sqrt{(10 \times 6)=\sqrt{60}=7.746}$$
$$r = 6/7.746 = 0.775 \text{ (strong positive correlation)}$$

Tip: Always interpret the value of r .

N8: Regression Equation of Y on X VIP

Given: $\sum X=20$, $\sum Y=30$, $\sum XY=140$, $\sum X^2=100$, $n=5$. Estimate Y when $X=7$.

$$b = [\sum EY - E\sum Y] / [\sum EX^2 - (E\sum X)^2], \quad a = \bar{Y} - b\bar{X}$$

$$b = [5(140) - 20(30)] / [5(100) - 400] = 100/100 = 1.0 \mid \bar{x}=4, \bar{y}=6 \mid a = 6 - 4 = 2$$

Regression equation: $Y = 2 + X$ | When $X=7$: $Y = 2+7 = 9$

Tip: Label which variable is being estimated.

N9: Laspeyres' & Fisher's Index VIP

Given: $\sum p_1q_0=250$, $\sum p_0q_0=160$, $\sum p_1q_1=300$, $\sum p_0q_1=200$

$$L = (\sum p_1q_0 / \sum p_0q_0) \times 100 \mid P = (\sum p_1q_1 / \sum p_0q_1) \times 100 \mid F = \sqrt{L \times P}$$

$$L = (250/160) \times 100 = 156.25 \mid P = (300/200) \times 100 = 150.0$$
$$F = \sqrt{156.25 \times 150} = \sqrt{23437.5} = 153.09$$

Tip: Fisher satisfies Time Reversal & Factor Reversal tests - hence 'ideal'.

N10: Linear Trend by Least Squares VIP

Given: Years: 2020-2024 | Y: 10,12,15,17,20. Estimate for 2028.

$$Y_c = a + bX, \quad b = [\sum EY - E\sum Y] / [\sum EX^2 - (E\sum X)^2], \quad a = \bar{Y} - b\bar{X}$$

Year	X(coded)	Y	XY	X ²
2020	-2	10	-20	4
2021	-1	12	-12	1
2022	0	15	0	0
2023	1	17	17	1

2024	2	20	40	4
Total	$\Sigma X=0$	$\Sigma Y=74$	$\Sigma XY=25$	$\Sigma X^2=10$

$$b = [5(25) - 0] / [5(10) - 0] = 125/50 = 2.5 \mid a = 74/5 - 0 = 14.8$$
$$\text{Trend: } Y_c = 14.8 + 2.5X \mid \text{For 2028: } X=6 \mid Y = 14.8+15 = 29.8$$

Tip: Code years so $\Sigma X=0$. This simplifies calculations enormously.

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Top 10 Expected MCQs

#	Predicted MCQ	Answer
1	Sum of deviations from AM	Zero
2	Range of r	-1 to +1
3	Fisher = GM of Laspeyres & Paasche	True
4	Two regression lines intersect at	($\bar{X}$, $\bar{Y}$)
5	r is GM of regression coefficients	True
6	If all values equal, SD =	Zero
7	Time variable in time series is	Non-random
8	CV is which type of measure	Relative
9	Empirical rule: within 1-sigma	68%
10	Pie chart represents	Parts of a whole

Top 10 Expected Short Questions

#	Predicted Short Question (3 marks)	#	Predicted Long Question / Numerical	Chapter
1	State properties of AM VIP	1	AM from grouped data (change of origin/scale) VIP	Location
2	Define index numbers & steps in construction VIP	2	Variance & SD from frequency distribution VIP	Dispersion
3	State properties of correlation coefficient VIP	3	Karl Pearson's coefficient of correlation VIP	Correlation
4	Differentiate absolute vs relative dispersion VIP	4	Regression equations & estimation VIP	Regression
5	Explain components of a time series VIP	5	Linear trend by least squares VIP	Time Series
6	Define quartiles, deciles, percentiles	6	Laspeyres' & Fisher's index numbers VIP	Index Numbers
7	Relationship between AM, GM, HM	7	CV comparison of two groups	Dispersion
8	Explain CPI construction in Pakistan	8	Median, Q1, Q3 from grouped data	Location
9	State properties of variance VIP	9	3-year & 5-year moving averages	Time Series
10	Differentiate fixed-base vs chain-base	10	Spearman's rank correlation	Correlation

7.1 All Important Formulas

Topic	Formula
AM (direct)	$\bar{X} = \Sigma fx / \Sigma f$
AM (shortcut)	$\bar{X} = A + (\Sigma fd / \Sigma f)$
AM (change of scale)	$\bar{X} = A + h \times (\Sigma fu / \Sigma f)$
Geometric Mean	$GM = (\Pi x_i)^{1/n}$ or $\log GM = \Sigma \log(x)/n$
Harmonic Mean	$HM = n / \Sigma(1/x)$
Median (grouped)	$Median = L + [(n/2 - cf)/f] \times h$
Quartiles	$Q_k = L + [(kn/4 - cf)/f] \times h$
Mode (empirical)	$Mode = 3 \times Median - 2 \times Mean$
Range / Coef. Range	$R = X_{max} - X_{min} \mid CR = (L-S)/(L+S)$
Mean Deviation	$MD = \Sigma x - \bar{X} / n$
Variance (shortcut)	$S^2 = (\Sigma fx^2/n) - \bar{X}^2$
Standard Deviation	$SD = \sqrt{Variance}$
Coefficient of Variation	$CV = (S/\bar{X}) \times 100$
Quartile Deviation	$QD = (Q3 - Q1)/2$
Karl Pearson r	$r = [\Sigma xy - n\bar{X}\bar{Y}] / \sqrt{(\Sigma x^2 - n\bar{X}^2)(\Sigma y^2 - n\bar{Y}^2)}$
Spearman Rank r	$r_s = 1 - [6\Sigma d^2/n(n^2-1)]$
Regression Y on X	$b = [n\Sigma XY - \Sigma X\Sigma Y] / [n\Sigma X^2 - (\Sigma X)^2]$
r from regression coeff	$r = \pm \sqrt{(b_{xy} \times b_{yx})}$
Laspeyres Index	$L = (\Sigma p_1q_0/\Sigma p_0q_0) \times 100$
Paasche Index	$P = (\Sigma p_1q_1/\Sigma p_0q_1) \times 100$
Fisher Index	$F = \sqrt{(L \times P)}$
Moving Average	$MA = (Y_1 + Y_2 + \dots + Y_k) / k$
Linear Trend	$Y_c = a + bX, a = \bar{Y} - b\bar{X}$

7.2 Key Concepts & Definitions

- $AM \geq GM \geq HM$ (equality when all values equal).
- Sum of deviations from AM is always zero. Variance is always non-negative.
- If all values equal, $SD = 0$. Normal dist: 68% within 1σ , 95% within 2σ , 99.7% within 3σ .
- r is unaffected by change of origin and scale. Two regression lines intersect at $(\bar{X}, \bar{Y})$.
- $r = \pm \sqrt{(b_{xy} \times b_{yx})}$. Fisher's index satisfies Time & Factor Reversal tests.
- In time series, time is non-random. Mode = $3Median - 2Mean$ (empirical).
- CV: lower = more consistent. Laspeyres overestimates; Paasche underestimates.
- Statistics: Science of collecting, organizing, analyzing & interpreting data.
- Population: Entire group. Sample: Subset. Index Number: Relative change over time.
- Laspeyres: base year quantities. Paasche: current year quantities. Fisher: GM of both.
- Trend: Long-term movement. Signal: Systematic component. Noise: Random component.
- CPI: Cost of living for consumers. WPI: Wholesale prices.
- Skewness: Asymmetry of distribution. Positive = right tail, Negative = left tail.
- Kurtosis: Peakedness of distribution. Leptokurtic = sharp, Platykurtic = flat.
- Quartile Deviation: Semi-interquartile range = $(Q3 - Q1)/2$. Less affected by extremes.
- Moving Average: For odd periods, centering is automatic. For even, take 2-period MA of MAs.
- Least squares coding: Choose X so $\Sigma X = 0$ to simplify trend calculations.
- Scatter diagram: Upward = positive r , Downward = negative r , Scattered = r near 0.

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7.3 One-Night-Before-Exam Strategy

- Prioritize Chapters 3 & 4 (Location & Dispersion) – highest weightage, most numericals.
- Practice 5 key numericals: AM grouped, Variance/SD, Karl Pearson r , Regression, Least squares trend.
- Memorize MCQ facts: sum of deviations=0, range of r , Fisher=GM of L&P, intersection at $(\bar{X}, \bar{Y})$.
- Index Numbers: Know L (base qty), P (current qty), F (GM). Practice one full numerical.
- Time Series: Know 4 components, moving average formula, least squares with year coding.
- Correlation: Know Karl Pearson formula, properties of r , Spearman rank formula.
- Regression: Know normal equations, how to find a & b , estimation of Y and X .
- Always show working: FBISE awards method marks even if final answer is wrong.
- Label answers clearly with units and interpretation (e.g., ' $r=0.85$ = strong positive correlation').
- Time management: ~1 min/MCQ, ~5 min/short, ~15 min/long. Bring a calculator.
- Revise formulas the night before – write them out from memory at least once.
- Stay calm during the exam – read each question twice before starting.

7.4 Common Mistakes to Avoid in the Exam

- Forgetting to compute midpoints (x) for grouped data before calculating AM or SD.
- Using class limits instead of class boundaries in median/quartile calculations.
- Confusing Laspeyres (base quantities q_0) with Paasche (current quantities q_1).
- Not coding years to make $\Sigma X = 0$ in least squares trend fitting.
- Forgetting to take the square root of variance to get standard deviation.
- Not interpreting the correlation coefficient (always state what r means).
- Mixing up the two regression equations (Y on X vs X on Y).
- Forgetting absolute values in mean deviation calculation.

Best of luck for FBISE HSSC-I Statistics Examination 2026!

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**FEDERAL BOARD OF INTERMEDIATE AND SECONDARY EDUCATION
ISLAMABAD**

**GUESS PAPER — ANNUAL EXAMINATION 2026
STATISTICS — PART I (HSSC-I)**

Time Allowed: 3 Hours

Maximum Marks: 100

NOTE: Attempt ALL questions from Section A. In Section B, attempt any SIX short questions from each set. In Section C, attempt any THREE long questions.

SECTION — A (Marks: 20)

Q.1 Select the correct answer. Each MCQ carries ONE mark. ($20 \times 1 = 20$)

1. Which of the following is NOT a characteristic of statistics?

- (A) Aggregate of facts (B) Affected by a single cause (C) Numerically expressed (D) Collected systematically

2. Data collected for the first time by the investigator is called:

- (A) Secondary data (B) Primary data (C) Discrete data (D) Continuous data

3. A frequency distribution with open-end classes is used when:

- (A) Data is discrete (B) Extreme values are present (C) All values are equal (D) Data is nominal

4. The cumulative frequency polygon is also called:

- (A) Histogram (B) Frequency polygon (C) Ogive (D) Bar chart

5. If the sum of deviations from mean is zero, the mean is called:

- (A) Assumed mean (B) Weighted mean (C) Arithmetic mean (D) Geometric mean

6. The geometric mean of 2, 4, and 8 is:

- (A) 4 (B) 4.67 (C) 6 (D) 14

7. Which measure of central tendency is NOT affected by extreme values?

- (A) Arithmetic Mean (B) Geometric Mean (C) Median (D) None of these

8. The coefficient of variation is defined as:

- (A) $\sigma/\bar{x} \times 100$ (B) $\sigma^2/\bar{x}$ (C) $\bar{x}/\sigma$ (D) $\sigma \times \bar{x}$

9. For a symmetrical distribution, the relationship between mean, median and mode is:

- (A) Mean > Median > Mode (B) Mean < Median < Mode (C) Mean = Median = Mode (D) None of these

10. A simple index number uses:

- (A) A single (B) Many commodities (C) Base year only (D) Current year only

commodity

11. Laspeyre's index number uses weights of:

- (A) Current year (B) Base year (C) Average of both years (D) Fixed year

12. If Laspeyre's index = 120 and Paasche's index = 110, then Fisher's ideal index is:

- (A) 115 (B) $\sqrt{(120 \times 110)}$ (C) 130 (D) 109

13. In regression $Y = a + bX$, the value of 'b' is called:

- (A) Y-intercept (B) Regression coefficient (C) Correlation coefficient (D) Slope intercept

14. If $b_{yx} = 0.8$ and $b_{xy} = 0.5$, then r equals:

- (A) $\sqrt{0.4}$ (B) 0.65 (C) 0.4 (D) 1.3

15. The value of correlation coefficient always lies between:

- (A) 0 and 1 (B) -1 and 0 (C) -1 and +1 (D) $-\infty$ and $+\infty$

16. Spearman's rank correlation formula uses:

- (A) Actual values (B) Squared differences of ranks (C) Product of deviations (D) Sum of ranks

17. In a time series, the long-term smooth movement is called:

- (A) Cyclical variation (B) Seasonal variation (C) Secular trend (D) Irregular variation

18. Moving averages are used to:

- (A) Eliminate trend (B) Eliminate seasonal variation (C) Smooth out fluctuations (D) Find index numbers

19. Standard deviation is the _____ root of variance:

- (A) Square (B) Cube (C) Fourth (D) Fifth

20. The range of a data set {3, 7, 2, 9, 5} is:

- (A) 5 (B) 7 (C) 6 (D) 9

SECTION — B (Marks: 48)

Attempt any SIX short questions from each set. ($6 \times 2 = 12$ marks per set)

Q.2 SET-I [Ch. 1 — Introduction, Ch. 2 — Presentation of Data] (6/9)

- (i) Define statistics. State any two characteristics of statistics.
- (ii) Distinguish between primary data and secondary data with one example each.
- (iii) What is meant by 'classification of data'? State its objectives.
- (iv) Define frequency distribution. What is the difference between class boundary and class limit?
- (v) A data set has classes 10–20, 20–30, 30–40. Find class width, mid-point of second class, and class boundaries.

- (vi) The following are the marks of 10 students: 45, 52, 63, 41, 72, 55, 68, 47, 59, 70. Prepare a stem-and-leaf display.
- (vii) Define histogram. How does it differ from a bar chart?
- (viii) The following frequency distribution is given. Find the cumulative frequencies:
Class: 10–20, 20–30, 30–40, 40–50 | f: 5, 12, 18, 7. Find 'less than' cumulative frequency.
- (ix) What is an ogive? State its two uses.

Q.3 SET-II [Ch. 3 — Measures of Location, Ch. 4 — Measures of Dispersion] (6/9)

- (i) The marks of 7 students are: 8, 12, 15, 20, 14, 10, 17. Calculate the arithmetic mean.
- (ii) Find the median and mode of: 4, 7, 3, 9, 7, 5, 7, 2, 8, 6.
- (iii) Calculate geometric mean of 4, 8, and 16.
- (iv) The following data is given: $\bar{x} = 40$, $\Sigma f = 50$, $\Sigma fd = -20$, $h = 5$. Find the corrected mean.
- (v) Define variance and standard deviation. State the relationship between them.
- (vi) Find range and coefficient of range for: 12, 25, 18, 9, 30, 22.
- (vii) Given: $n = 10$, $\Sigma x = 200$, $\Sigma x^2 = 4200$. Find variance and standard deviation.
- (viii) Marks of two groups are given. Group A: Mean = 50, S.D. = 10. Group B: Mean = 40, S.D. = 9. Which group is more consistent?
- (ix) Define quartile deviation. How is it calculated? Why is it preferred over range?

Q.4 SET-III [Ch. 5 — Index Numbers, Ch. 6 — Regression] (6/9)

- (i) Define index number. State its uses.
- (ii) Calculate Laspeyre's price index from the following:
Commodity A: $p_0 = 10$, $p_1 = 12$, $q_0 = 5$ | Commodity B: $p_0 = 8$, $p_1 = 10$, $q_0 = 3$
- (iii) Calculate Paasche's price index using: $p_0 = [5, 8]$, $p_1 = [7, 10]$, $q_1 = [10, 6]$.
- (iv) Define Fisher's ideal index. Why is it called 'ideal'?
- (v) What is a simple aggregate index? Calculate it for $p_0 = [4, 6, 8]$ and $p_1 = [5, 7, 10]$.
- (vi) Define regression. Distinguish between dependent and independent variable.
- (vii) Given $n=5$, $\Sigma x=15$, $\Sigma y=25$, $\Sigma xy=85$, $\Sigma x^2=55$. Find regression coefficients b_{yx} and the value of 'a'.
- (viii) Define the two regression lines. Under what condition do they coincide?
- (ix) Write the properties of regression coefficients.

Q.5 SET-IV [Ch. 7 — Correlation, Ch. 8 — Time Series] (6/9)

- (i) Define correlation. Distinguish between positive and negative correlation.
- (ii) Calculate Karl Pearson's coefficient of correlation from: $\Sigma xy = 120$, $n = 10$, $\sigma x = 3$, $\sigma y = 4$. Use formula $r = \Sigma xy / (n \cdot \sigma x \cdot \sigma y)$.
- (iii) Following ranks are given to 6 students in Math and Science: Rank in Math: 1,2,3,4,5,6; Rank in Science: 2,1,4,3,6,5. Find Spearman's rank correlation.
- (iv) If $b_{yx} = 0.6$ and $b_{xy} = 0.4$, find r . Comment on the result.
- (v) What are the components of a time series? Name and briefly explain them.
- (vi) Following data shows sales (Rs. 000s): Year: 2019, 2020, 2021, 2022, 2023; Sales: 20, 24, 30, 28, 36. Compute 3-year moving averages.
- (vii) Fit a trend line by least squares method. Given: $\Sigma x=0$, $\Sigma y=150$, $\Sigma xy=50$, $\Sigma x^2=10$, $n=5$.
- (viii) Distinguish between secular trend and seasonal variation with examples.
- (ix) What is meant by deseasonalization of data? State its importance.

SECTION — C (Marks: 32)

Attempt any FOUR long questions. Each question carries 8 marks. ($4 \times 8 = 32$)

Q.6 [Chapter 3 — Measures of Location]

The following frequency distribution shows the daily wages of 60 workers:

Wages (Rs.)	No. of Workers (f)
100 – 150	5
150 – 200	10
200 – 250	20
250 – 300	15
300 – 350	7
350 – 400	3

Calculate: (i) Arithmetic Mean (ii) Median (iii) Mode

Q.7 [Chapter 4 — Measures of Dispersion]

Following data gives scores of students in a statistics test:

Scores (X)	Frequency (f)
10 – 20	3
20 – 30	7
30 – 40	15
40 – 50	10
50 – 60	5

Calculate: (i) Mean Deviation from Mean (ii) Variance (iii) Standard Deviation (iv) Coefficient of Variation

Q.8 [Chapter 5 — Index Numbers]

Calculate Laspeyre's, Paasche's, and Fisher's Ideal Price Index Numbers from the following data:

Commodity	p_0	p_1	q_0	q_1
A	4	6	50	60
B	5	8	40	50
C	8	10	30	25
D	10	14	20	20

Also verify that Fisher's Index = $\sqrt{(\text{Laspeyre's} \times \text{Paasche's})}$

Q.9 [Chapter 6 — Regression]

From the following data, find the two regression lines and estimate Y when X = 25 and X when Y = 30:

X	Y
10	14
20	27
30	29
40	42
50	38

Q.10 [Chapter 7 — Correlation]

Calculate Karl Pearson's coefficient of correlation from the following data. Also find coefficient of determination and interpret the result.

X (Advertising Rs. 000)	Y (Sales Rs. 000)
12	30
15	38
18	45
22	52
26	60
30	70

Q.11 [Chapter 8 — Time Series]

The following data gives the annual production (in thousand tonnes) of a factory. Fit a straight-line trend by the method of least squares (use coding: let $\Sigma x = 0$) and estimate production for year 2026.

Year	Production (Y)
2019	22
2020	25
2021	27
2022	30
2023	35

Also calculate 3-year and 5-year moving averages from the same data.

★ Good Luck ★ Prepared according to FBISE Annual Exam 2026 Pattern ★

Note: This guess paper is prepared on the basis of FBISE model paper pattern and past paper trends. All numerical questions are prioritized as per FBISE preference.

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