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Roll No. ☐☐☐☐☐☐

Sig. of Candidate._____

Answer Sheet _____

Sig. of Invigilator._____

STATISTICS HSSC–I

SECTION – A (Marks 17)

Time allowed: 25 Minutes

NOTE: Section–A is compulsory and comprises pages 1 – 2. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting / overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

(i) The data which have already been collected by some one are called_____.

    A. Secondary data   B. Primary data

    C. Arrayed data   D. None of these

(ii) A graph of cumulative frequency distribution is called_____.

    A. Historigram   B. Frequency polygon

    C. Ogive   D. None of these

(iii) Total angle of Pie chart is_____.

    A. 270^0 B. 300^0

    C. 320^0 D. 360^0

(iv) If a curve has a longer tail to the left, it is called a_____.

    A. Symmetrical curve   B. Positively skewed curve

    C. Negatively skewed curve   D. None of these

(v) If the mean is less than mode, the distribution is_____.

    A. Positively skewed   B. Negatively skewed

    C. Symmetrical   D. None of these

(vi) The most central value of an arrayed data is_____.

    A. Mode   B. Median

    C. Mean   D. Harmonic mean

(vii) The mode of 2, 10 and 7 is_____.

    A. 10   B. 2

    C. 7   D. None of these

(viii) In a symmetrical distribution, the mean, median and mode are_____.

    A. Always equal   B. Sometimes equal

    C. Never equal   D. None of these

(ix) For a certain distribution if $\sum(x-14)=5, \sum(x-25)=0 \ and \ \sum(x-20)=18$ the value of mean is _____.

    A. Zero   B. 25

    C. 18   D. 14

(x)   The variance of a constant is equal to _____.

    A.   Constant   B.   Zero

    C.   Unity   D.   None of these

(xi)   If x and y are independent, $Var(x-y)$ is equal to _____.

    A. $Var(x)+Var(y)$ B. $Var(x)-Var(y)$

    C. $Var(x+y)$ D.   Zero

(xii)   If the third moment about mean is zero $(m_3 = 0)$ the distribution is _____.

    A.   Mesokurtic   B.   Leptokurtic

    C.   Symmetrical   D.   Platykurtic

(xiii) Second moment about mean is always equal to _____.

    A.   0   B.   1

    C.   Variance   D.   Standard deviation

(xiv)   The index given by $\dfrac{\sum P_n q_n}{\sum P_o q_o} \times 100$ is _____

    A.   The Laspeyre's index   B.   The Paasche's index

    C.   The Value index   D.   None of these

(xv)   If Laspeyre's index number is 200, Paasche's index number is 200 the Fisher's index number is_____.

    A.   100   B.   200

    C.   Zero   D.   400

(xvi)   Increased demand for coolers in summer and heaters in winter is an example of _____

    A.   Secular trend   B.   Cyclical variation

    C.   Seasonal variation   D.   Irregular variation

(xvii) In chain base method, the base period is_____.

    A.   Fixed   B.   Changed

    C.   Constant   D.   None of these

For Examiner's use only:

Total Marks: | 17 |

Marks Obtained: | |

STATISTICS HSSC–I

Time allowed: 2:35 Hours   **Total Marks Sections B and C: 68**

NOTE: Sections 'B and C' comprise pages 1-2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly.

SECTION – B (Marks 42)

Q. 2   **Attempt any FOURTEEN parts. All parts carry equal marks.**   **(14 x 3 = 42)**

(i)   Give three examples of Quantitative variable.

(ii)   Given the frequencies of 5 classes 2,6,7,3,4. Find Cumulative frequencies and Relative frequencies.

(iii)   The mean of 10 numbers is 8. If an eleventh number is included, the mean becomes 9. What is the value of the eleventh number?

(iv)   The sum of deviations of 15 values from 20 is 45. Find Arithmetic Mean.

(v)   Write three properties of Arithmetic Mean.

(vi)   Three teachers of statistics reported mean examination grades of 75, 82 and 85 for their classes which consisted of 30, 25 and 17 students. Determine the mean grade for all the classes.

(vii)   Define **Quartile**, **Decile** and **Percentile**.

(viii)   By adding 5 to each of numbers in the set 3,6,2,1,5, we obtain 8,11,7,6,10. Show that the two sets have the same variance.

(ix)   Calculate Standard Deviation if $n=10, \sum u = 100, \sum u^2 = 2212 \; and \; h = 2$.

(x)   List any three methods for calculation dispersion.

(xi)   Compute base year weighted and current year weighted price index numbers for the given data:

$$\sum P_o q_o = 35310, \sum P_n q_n = 46707, \sum P_n q_o = 41140 \; and \; \sum P_o q_n = 39644$$

(xii)   Distinguish between an Unweighted index number and a Weighted index number.

(xiii)   Given $n = 100, \sum x = 5000, \sum y = 6000, \sum xy = 300300, \; \sum x^2 = 25400 \; and \; \sum y^2 = 360900$. Calculate two regression co-efficients y on x and x on y.

(xiv)   Describe the two lines of Regressions.

(xv)   Two regression lines are:

$$Y = 19.55 + 0.5423\,x$$
$$X = 3.62 + 1.2387\,y$$

Find the correlation coefficient $'r'$

(xvi)   Given $n = 10 \, , \; \sum D_x = -8, \sum D_y = 0 \, , \; \sum D_x^2 = 66 \, , \sum D_y^2 = 99$ and $\sum D_x D_y = 72$

Calculate the correlation coefficient.

(xvii)   State three properties of the correlation coefficient.

(xviii)   Define Seasonal movements.

(xix)   What are the main components of time series?

SECTION – C (Marks 26)

Note: **Attempt any TWO questions. All questions carry equal marks.**   (2 x 13= 26)

Q. 3   **a.**   Find arithmetic mean, geometric mean and harmonic mean for the following data and prove that $A.M > G.M > H.M$:

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	5	10	15	7	3

b.   The first four moments of a distribution about x=2.0 are 1 , 2.5, 5.5 and 16. Calculate:

(i)   The first four moments about mean.

(ii)   Co-efficient of variation.

Q. 4   Calculate base year weighted and current year weighted price index numbers. Also calculate Fisher ideal price index number for the data given below:

Show that: Fisher's Ideal index number= $\sqrt{Laspeyre's \times Paasche's}$

Commodities	Base year		Current year	
	Price	Quantity	Price	Quantity
A	3	70	4	75
B	5	80	6	90
C	8	40	10	55
D	10	50	12	60

Q. 5   **a.**   Find correlation co-efficients r_{xy}. Also find two regression co-efficients b_{xy} and b_{yx} and prove that $r_{xy} = \sqrt{b_{xy} \times b_{yx}}$ for the following values of x and y:

x	1	2	3	4	5	6	7	8
y	3	4	6	8	10	12	14	15

b.   Compute 3 year and 5 year moving averages from the following data:

Year	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Production	115	120	116	113	123	120	127	132	122	127

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