Statistics   **H.S.S.C (12th) 1st Annual 2024**   Roll No._____ (To be written by the candid

Paper : II   Objective | Paper Code | 8 | 1 | 8 | 1 | Marks:17   Time : 20 Minut

Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle
front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circl
will result no mark.

SECTION–A

Q.1	Questions	A	B	C	D
1.	In normal distribution $\mu = 20$, $\sigma^2 = 64$ then the first mean moment is:	3	4	0	2
2.	The shape of the normal distribution is:	Leptokurtic	Mesokurtic	Platykurtic	Skewed
3.	In standardized normal distribution, its mean is:	0	3	μ	σ
4.	In sampling with replacement, a sampling unit can be selected:	Only once	Less than one	More than once	None
5.	Another name of probability sampling is:	Non probability sampling	Judgment sampling	Purposive sampling	Random sampling
6.	The finite population correction factor is:	n/N	$\frac{N-n}{N-1}$	N/n	$\sqrt{\frac{N-n}{N-1}}$
7.	A statistic $\hat{\theta}$ is said to be unbiased estimator of θ, if:	$E(\hat{\theta}) = \theta$	$E(\hat{\theta}) > \theta$	$E(\hat{\theta}) \neq \theta$	$E(\hat{\theta}) < \theta$
8.	In point estimation we get:	More than one value	Value in interval	Similar values	Single value

	Questions	A	B	C	D
9.	In applying t-test:	n is large	σ is known	σ is unknown	None of these
10.	The best fitted trend is one in which sum of squares of error is:	Maximum	Minimum	0	3
11.	If $Y = 2 + 0.8x$, then slope of line is:	0.8	2	0.4	1.6
12.	If $r_{xy} = 0$, then X and Y are:	Zero	Associated	Dependent	Independe
13.	For $r \times C$ contigency table, the chi-square test has d.f:	$(r-1)+(c-1)$	$(r-1)-(c-1)$	$(r-1)(c-1)$	$(r-1)(c-$
14.	The two attributes are independent if:	$Q = -1$	$Q = 1$	$Q = 2$	$Q = 0$
15.	Graph of time series is called:	Histogram	Historigram	Trend	Straight li
16.	In moving average method, we cannot find trend values of some:	Starting and end period	End period	Middle period	Starting pe
17.	Joystick is an example of:	Input device	Output device	Storage device	Processing d

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Note :- Section B is compulsory. Attempt any THREE Questions from Section C.

SECTION – B

Sahiwal Board-2024

2. Write short answers to any EIGHT parts. (8 x 2 = 16)

i. What is p.d.f of normal distribution?

ii. Define the Normal Curve.

iii. Discuss the role of "σ" in normal distribution.

iv. If $X \sim N(15,4)$, find the value of Z if $X = 18$

v. If $X \sim N(24,16)$, find Q_1

vi. Define the term Estimate.

vii. If $a = 5\%$ then what will be the confidence level?

viii. Explain the term null hypothesis.

ix. Discuss the simple hypothesis.

x. Given that $n = 10$, $\bar{X} = 90$, $\sigma = 4$ and $\mu = 80$, find Z

xi. What is computer?

xii. Explain the term software.

3. Write short answers to any EIGHT parts. (8 x 2 = 16)

i. Differentiate between sampling and non sampling errors.

ii. What is meant by target population?

iii. Define Sampling Frame.

iv. Find $\sigma^2_{\bar{X}}$, given that $n = 4$ $\mu = 5$ and $\delta = 1.5$ if sampling is done with replacement.

v. Define Sampling Distribution.

vi. If sampling is done without replacement and given that $N = 5$, $n = 2$, $P = \frac{2}{5}$, find σ^2_P

vii. Define Dependent Variable in Regression.

viii. In a regression line, $\hat{X} = a + by$, $\sum X = 215$, find $\sum \hat{X}$

ix. Give any two properties of regression co-efficient.

x. Find r given that $b_{yx} = 1.2$ and $b_{xy} = 0.6$

xi. Define the term "Correlation Co-Efficient".

xii. If $\bar{X} = 50$, $\bar{Y} = 110$, $a = 10$, find value of regression coefficient.

4. Write short answers to any SIX parts. (6 x 2 = 12)

i. Define Multinomial Population.

ii. Describe Spearman's co-efficient of rank correlation.

iii. Determine the nature of association between A and B if $(A) = 415$, $(\alpha) = 285$, $(AB) = 147$, $(\alpha\beta) = 170$

iv. Write a short note on time series.

v. Distinguish between histogram and historigram.

vi. State the name of four phases of cyclical variations in time series

vii. What is method of least squares?

viii. Fit a straight-line if $\sum Y = 300$, $\sum X = 0$, $\sum X^2 = 28$, $\sum XY = 14$ for years from 2000 to 2009.

ix. Define Secular Trend.

(2)

SECTION – C
Attempt any THREE Questions. Each question carries (4+4=8) marks. (8x3=24)

5. (a) If a die is rolled 120 times, find the probability that even number appears:

(i) More than 70 times (ii) Less than 80 times

(b) In normal distribution if $\mu = 100$ and $\sigma = 5$, find P_{63} and D_4

6. (a) Take all possible samples of size 3 from a population comprising the numbers 2 & 6. Verify that:

(i) $\mu_{\bar{X}} = \mu$ (ii) $\sigma^2 = n\sigma^2_{\bar{X}}$

(b) Take all possible samples of size 2 with replacement from the letters B,A,O. Considering proportions of vowels, verify that:

(i) $\mu_P = \pi$ (ii) $\sigma^2_P = \frac{\pi(1-\pi)}{n}$

7. (a) A random sample of 200 persons from a city was interviewed and 50 of them were found to be literate. Calculate a 90% confidence interval for the proportion of literate persons in the city.

(b) Suppose you wish to estimate the effects of a certain sleeping pill on men and women. Two samples are independently taken and the relevant data are shown as given:

	Men	Women
Sample size	$n_1 = 36$	$n_2 = 64$
Sample mean	$\bar{X}_1 = 8.75$	$\bar{X}_2 = 7.25$
Population variance	$\sigma^2_1 = 9$	$\sigma^2_2 = 4$

Test the null hypothesis $H_o : \mu_1 = \mu_2$ at $\alpha = 0.05$

8. (a) Compute the regression line Y on X for this data:

$n = 24$, $\sum X = 5402$, $\sum Y = 4378$, $\sum X^2 = 1388656$, $\sum Y^2 = 911032$, $\sum XY = 1118516$

(b) Calculate correlation co-efficient for the following data:

X	4	8	12	16	20	24
Y	5	10	15	20	25	30

9. (a) Find x^2 and test whether the attributes are independent at $\alpha = 0.05$

	A_1	A_2	A_3
B_1	215	325	60
B_2	135	175	90

(b) Calculate two years centred moving average from the following time series:

Years	1920	1921	1922	1923	1924	1925
Y	800	840	882	900	910	950

Roll No. ☐☐☐☐☐☐ (To be filled in by the candidate)

Statistics

H.S.S.C (12th) 1st Annual 2023

Time : 20 Minutes

Paper : II

OBJECTIVE

Marks : 17

Paper Code | 8 | 1 | 8 | 1

Note:- You have four choices for each objective type question as A, B, C and D. The choice which you think is correct: fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION–A

Q.1	Questions	A	B	C	D
1.	Support of normal distribution is.	0 to 1	0 to ∞	-1 to $+1$	$-\infty$ to ∞
2.	Normal distribution is.	Symmetric	Positively skewed	Negatively skewed	All of these
3.	If $X \sim N(\mu, \sigma^2)$, then standard normal variable Z is:	$\dfrac{X+\mu}{\sigma}$	$\dfrac{X-\sigma}{\mu}$	χ^2	$\dfrac{X-\mu}{\sigma}$
4.	Total samples in with –replacement sampling:	N^n	$^N C_n$	n^N	$^n C_N$
5.	What is possible in sampling without replacement?	$N = n$	$N > n$	$N < n$	A & B
6.	If P is sample proportion, then for sampling without replacement:	$E(P)=\pi$	$\dfrac{\pi(1-\pi)}{n}\cdot\dfrac{N-n}{N-1}=Var(P)$	$\sqrt{n(N-1)}(\sigma_p)=\sqrt{\pi(1-\pi)(N-n)}$	All of these
7.	Point estimate of difference between two population mean $(\mu_2 - \mu_1)$ is:	$\bar{X}_1 + \bar{X}_2$	$\bar{X}_1 - \bar{X}_2$	$\bar{X}_2 - \bar{X}_1$	$\bar{X}_1 \bar{X}_2$
8.	For with replacement sampling, $Var(\bar{X}_1 - \bar{X}_2)$ is:	$\dfrac{\sigma_1^2}{n_1}+\dfrac{\sigma_2^2}{n_2}$	$\dfrac{\sigma_1^2}{n_1}-\dfrac{\sigma_2^2}{n_2}$	$\sigma_1^2 \sigma_2^2 / n_1 n_2$	$n_1 n_2 / \sigma_1^2 \sigma_2^2$
9.	Which of the given is not a proper Null hypothesis?	$H_o: \mu < 7$	$H_o: \mu > 7$	$H_o: \mu \neq 7$	All of these
10.	In Y =a+bX:	$-\infty < a < \infty$	$-\infty < b < \infty$	$\sum y = \sum \hat{y}$	All of these
11.	Objective of correlation is to study:	Strength of relationship	Functional relationship	Association of attributes	All of these
12.	Which of the given one is true for regression?	$\sum y = \sum \hat{y}$	$b_{yx} = r\dfrac{S_y}{S_x}$	$\sum e_i = 0$	All of these
13.	Formula of chi-square (χ^2) is:	$\sum\left(\dfrac{o-e}{e}\right)^2$	$\sum(o-e)/e^2$	$\sum\left[\dfrac{(o-e)^2}{e}\right]$	$\dfrac{\sum(0-e)^2}{\sum e^2}$
14.	If expected frequencies are equal to corresponding observed frequencies, then value of χ^2 is:	∞	1	0	2
15.	Chronological data is another name for.	Time Series Data	Primary Data	Secondary Data	Qualitative Data
16.	How many components are there in a time series?	2	3	4	5
17.	Windows 10 is an example of:	Operating System	Hardware	Processor	All of these

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Roll No. ☐☐☐☐☐☐ (To be filled in by the candidate)

Statistics

H.S.S.C (12th) 1st Annual 2023

Time : 2:40 Hours

Paper : II

Subjective

Marks : 68

Note :- Section B is compulsory. Attempt any Three Questions from Section C.

SECTION – B

2. Write short answers to any Eight parts. (8 x 2 = 16)
   i. Define standard normal distribution.
   ii. Give any two properties of normal distribution.
   iii. In a normal distribution, Q_1=65 and Q_3=75, find the value of mean.
   iv. In a normal distribution $\mu_2 = 4$, find μ_4.
   v. Write down equation of the normal curve.
   vi. What is meant by Estimation?
   vii. What is unbiased Estimator?
   viii. Define critical value.
   ix. Define type-II Error.
   x. What is two tailed test?
   xi. Define input device.
   xii. What is operating system?

3. Write short answers to any Eight parts. (8 x 2 = 16)
   i. Given $N=1000$ n=50 $\sigma = 9$. If sampling is done without replacement then find $Var(\bar{X})$
   ii. Define the sampled population.
   iii. What is sampling?
   iv. Distinguish between finite and infinite population.
   v. All possible samples are drawn from a normal population with $\mu=50$ and $\sigma = 5$. What is the sample size if the standard error of $\bar{X}$ is 1.0
   vi. Define sampling distribution.
   vii. Write the normal equations of straight line Y on X.
   viii. What is meant by residual in regression model?
   ix. For the regression lines
       (i) $\hat{y} = 15 - 1.96$
       (ii) $\hat{x} = 9 - 0.5y$
       Calculate the values of byx and bxy.
   x. Define correlation.
   xi. Given bxy=–1.4 and r_{xy}=–0.8, find byx.
   xii. Write down two properties of correlation coefficient.

4. Write short answers to any Six parts. (6 x 2 = 12)
   i. Explain class frequency.
   ii. Differentiate between variable and attribute.
   iii. If n=120, (A)=82, (AB)=90, find consistence of data.
   iv. Give two examples of time series data.
   v. What are the steps to construct the historigram?
   vi. Describe seasonal variation in time series.
   vii. Explain irregular movements in time series.
   viii. Explain the method of semi-averages.
   ix. Given $\Sigma x = 0, \Sigma y = 245, \Sigma x^2 =28, \Sigma xy = 66$ and n=7. Fit a linear trend.

SECTION – C

Note: Attempt any Three question. Each question carries 8 marks.

5. (a) If $X \sim N(70,25)$, find a point that has 87.9% of the distribution below it.
   (b) In a normal distribution, 31% of items are under 45 and 8% are over 64. Find the mean and standard deviation of the normal distribution.

6. (a) Take all possible samples of size 2 without replacement from the population 4,5,6,7, 8. Show that
       (i) $\mu_{\bar{X}} = \mu$ (ii) $\sigma^2_{\bar{X}} = \frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)$
   (b) Given that $n_1 = 2, \mu_1 = 6, \sigma^2_1 = 2.67$
       $n_2 = 2, \mu_2 = 2, \sigma^2_2 = 0.67$
       Find $\mu_{\bar{X}_1 - \bar{X}_2}$ and $\sigma_{\bar{X}_1 - \bar{X}_2}$

7. (a) A random sample of 64 is taken from a certain population with a known standard deviation $\sigma = 16$. If the mean of the sample is 82, compute a 95% confidence interval for population mean.

(b) A random sample of 10 from a population gave $\bar{X} = 20$. and $\Sigma(X-\bar{X})^2 = 144$. Test $H_o : \mu = 19.5$. against $H_1; \mu > 19.5$. at $\propto = 0.05$

8. (a) Suppose that four randomly chosen plots were treated with various levels of fertilizer, resulting in the following yields of corn.

Fertilizer (x)	100	200	400	500
Production (y)	70	70	80	100

   (i) Estimate the line of regression for Y on X.
   (ii) Estimate the yield when no fertilizer is applied.

(b) Find the co-efficient of correlation if the two regression co-efficients have the following values:

   (i) $byx = 0.45, \ bxy = 0.8$

   (ii) $byx = -0.1, \ bxy = -0.4$

9. (a) During influenza epidemic 15 boys and 8 girls became ill out of a class of 22 boys and 28 girls.
   (i) Draw up a contingency table.
   (ii) Test the hypothesis of no dependence at 0.05 level of significance.

(b) Calculate trend values by semi-average for the given data. Also write the equation taking origin at 1980 and find estimate for 1990.

Years	1980	1981	1982	1983	1984	1985	1986	1987	1988
Values	12	14	16	18	17	16	18	10	12

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Roll No._____ Annual 2018

Statistics (New Scheme)   (INTER PART II - CLASS 12ᵗʰ)(IV)   Time :20 Minutes
Paper : II   OBJECTIVE   Marks : 17

Code : 8187

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number with marker or pen. Cutting or filling two or more circles will result in zero mark in that question.

1. i. **Level of significance is denoted by**
   (A) $1-\alpha$ (B) β (C) α (D) $1-\beta$

   ii. **If $E(\hat{\theta}) = \theta$ then θ is**
   (A) biased   (B) unbiased   (C) consistent   (D) none

   iii. **$\sigma/\sqrt{n}$ is equal to**
   (A) $\mu\bar{x}$ (B) $S.E(\bar{x})$ (C) σ^2 (D) S^2

   iv. **If P = 0.7 , n = 10 then $E(\hat{P})$ is**
   (A) 0.07   (B) 0.7   (C) 7   (D) 0.35

   v. **Population parameters are denoted by**
   (A) Roman letters   (B) Greek letters   (C) Latin letters   (D) English letters

   vi. **In normal distribution, μ_3 is**
   (A) -1   (B) zero   (C) +1   (D) $\propto$

   vii. **In normal distribution Q. D is**
   (A) $\frac{4}{5}\sigma$ (B) $\frac{2}{3}\sigma$ (C) $\frac{1}{2}\sigma$ (D) 3σ

   viii. **The parameters of normal distribution are**
   (A) (n , p) (B) (μ,σ^2) (C) (μ, p) (D) (np , nq)

   ix. **Another name of independent variable is**
   (A) regressand   (B) regressor   (C) predictand   (D) dependent

   x. **If two variables are uncorrelated, the value of " r " is**
   (A) -1   (B) +1   (C) zero   (D) 2

   xi. **In regression, $\sum(y-\hat{y})$ is equal to**
   (A) -1   (B) +1   (C) zero   (D) $\sum\hat{y}$

   xii. **The value of Chi-square cannot be**
   (A) zero   (B) negative   (C) positive   (D) 2

   xiii. **For 3×3 contigency table, the number of cells in the table are**
   (A) 3   (B) 6   (C) 9   (D) 4

   xiv. **If a straight line is fitted to the time series then**
   (A) $\sum y = \sum\hat{y}$ (B) $\sum y < \sum\hat{y}$ (C) $\sum y > \sum\hat{y}$ (D) $\sum(y-\hat{y})^2 = 0$

   xv. **Depression in business is**
   (A) secular trend   (B) seasonal variation   (C) cyclical variation   (D) irregular variation

   xvi. **A binary digit is commonly called**
   (A) bit   (B) byte   (C) kilo byte   (D) giga byte

   xvii. **Test - statistic , $t = \frac{\bar{X}-\mu}{s/\sqrt{n}}$ has d.f .**
   (A) n   (B) n-1   (C) n-2   (D) n+1

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Statistics
(New Scheme)
Paper : II

(INTER PART II - CLASS 12th)

Sahiwal Board-2018
SUBJECTIVE

Time : 2: 40 Hours

Marks : 68

Note :- **Section I is compulsory. Attempt any three Questions from section II.**

2. **Write short answers to any Eight parts.** $(8 \times 2 = 16)$

i. Write properties of normal distribution.

ii. In normal distribution $\mu_2 = 4$, find μ_3 and μ_4.

iii. In normal distribution $\sigma = 9$, find quartile deviation.

iv. In normal distribution $\sigma = 5$, find mean deviation.

v. In normal distribution $\sigma^2 = 25$, find the value of β_1 and β_2.

vi. Define statistical inference.

vii. Define Type – two error.

viii. Define two tailed test.

ix. Define test statistic.

x. Define interval estimation.

xi. Define computer.

xii. Define the term CPU.

3. **Write short answers to any Eight parts.** $(8 \times 2 = 16)$

i. Define sampling unit.

ii. Define finite and infinite populations.

iii. What are the basic aims of sampling.

iv. define random sampling.

v. Define sampling error.

vi. Define sampling distribution.

vii. Write normal equations for the regression equation $\hat{y} = a + bx$

viii. Estimate Y for X = 12 from the regression equation $\hat{Y} = -5.08 + 0.727X$

ix. If C = 130 and d = 3.956, write down the regression equation $\hat{X} = C + dY$ and estimate X when Y=10.

x. Interpret the meaning of r = -1 and r = +1.

xi. Write down any two formulas of correlation co-efficient.

xii. Given that $Sxy = 72$, $Sx = 4.5$ and $Sy = 18$, Find r_{xy}.

4. **Write short answers to any Six parts.** $(6 \times 2 = 12)$

i. Define the term rank correlation.

ii. Interpret the meaning when coefficient of association is zero.

iii. Find the coefficient of association from the following data.,

$(AB) = 528$, $(A\beta) = 790$, $(\alpha B = 25)$, $(\alpha\beta) = 175$

iv. What is meant by negative association?

v. Define the term time series.

vi. Name four components of time series.

vii. What is meant by Secular trend?