

Roll No. _____

STATISTICS

Intermediate Part-II, Class 12th (1stA 424- IV)

Paper: II

Time: 20 Minutes

OBJECTIVE Code: 8187

Marks: 17

- 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. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.
1. 1- Which of the following can be alternative hypothesis H_1 ?
 (A) $\theta \geq \theta_0$ (B) $\theta \leq \theta_0$ (C) $\theta = \theta_0$ (D) $\theta \neq \theta_0$
 - 2- The sale of ice cream in summer is an example of
 (A) secular trend (B) cyclical variations (C) seasonal variations (D) irregular variations
 - 3- A sequence which follows regular variations is called
 (A) signal (B) noise (C) model (D) trend
 - 4- The limits of the normal distribution are
 (A) $-\infty$ to $+\infty$ (B) 0 to ∞ (C) $-\infty$ to 0 (D) 0 to 1
 - 5- If $E(\hat{\theta}) = \theta$, then $\hat{\theta}$ is called
 (A) biased estimator (B) positively biased (C) unbiased estimator (D) negatively biased
 - 6- Cursor on the screen can be moved by
 (A) Keyboard (B) Mouse (C) Scanner (D) CD Rom
 - 7- The co-efficient of association Q lies between
 (A) 0 and +1 (B) -1 and +1 (C) $-\infty$ and +1 (D) $-\infty$ to $+\infty$
 - 8- In the regression equation: $y = a + bx$, y is called
 (A) dependent variable (B) independent variable
 (C) qualitative variable (D) continuous variable
 - 9- In simple regression, $\Sigma(Y - \hat{Y})$ is
 (A) negative (B) zero (C) positive (D) fractional
 - 10- In a normal distribution, $\mu = 10$ and $\sigma^2 = 25$, the mode is
 (A) 5 (B) 25 (C) 100 (D) 10
 - 11- If $\sigma^2 = 5$ and $n = 2$, then $\sigma_{\bar{x}}^2$ is (in case sampling is done with replacement)
 (A) 2 (B) 2.5 (C) 3 (D) 5
 - 12- A value calculated from sample data is called
 (A) Statistic (B) Parameter (C) Mean (D) Proportion
 - 13- Two types of estimation are
 (A) one and two sided (B) point and interval (C) biased and unbiased (D) type-I and type-II
 - 14- If $r_{xy} = -0.84$, then r_{yx} is
 (A) 0.42 (B) 0.84 (C) -0.84 (D) zero
 - 15- In a standard normal distribution, Q_1 is equal to
 (A) 0.7979 (B) 0.6745 (C) -0.6745 (D) -0.7979
 - 16- The value of χ^2 cannot be
 (A) zero (B) positive (C) $+\infty$ (D) negative
 - 17- The sum of frequencies in sampling distribution is equal to
 (A) zero (B) 1 (C) population size (D) No. of possible samples

Gujranwala Board-2024

STATISTICS

Intermediate Part-II, Class 12th (1stA 424)

Paper II

Time: 2:40 Hours

Marks: 68

SUBJECTIVE

Note: Section I is compulsory. Attempt any Three (3) questions from Section II.

SECTION I



(2 x 8 = 16)

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

- i- Define Standard Normal random variable.
- ii- Write down two properties of Normal Distribution.
- iii- Describe the normal probability density function.
- iv- If X is $N(20, 5)$. Find the value of the maximum ordinate.
- v- The Variance of Normal Distribution is 4. Find μ_4 .
- vi- Explain the term Estimation.
- vii- What is meant by Critical Region?
- viii- Elaborate one tail test.
- ix- Compute test-statistic 'z' if $\bar{X} = 116$, $\mu = 120$, $\sigma = 15$ and $n = 100$
- x- Given $s_1^2 = 1.43$, $s_2^2 = 5.21$, $n_1 = 10$, $n_2 = 10$. Compute S_p .
- xi- Explain the term Program.
- xii- Differentiate between low-level and high-level languages.

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

(2 x 8 = 16)

- i- Given $n = 25$, $\mu = 68.5$, $\sigma = 2.7$ and $N = 1000$, find $\sigma_{\bar{x}}$ and $\mu_{\bar{x}}$ using W.O.R sampling.
- ii- If $n = 400$, $\pi = 0.7$ and $N = 4500$, find μ_p and σ_p^2 using W.O.R sampling.
- iii- What is Sampling?
- iv- Define bias.
- v- What is Sampling Frame?
- vi- Differentiate between stratum and stratification.
- vii- What is regression analysis?
- viii- If $n = 10$, $\Sigma x = 20$, $\Sigma y = 260$, $\Sigma xy = 3490$ and $\Sigma x^2 = 3144$, find b_{yx} .
- ix- Write two assumptions of regression.
- x- Define positive correlation.
- xi- Given, $S_x^2 = 9.1$, $S_y^2 = 9.1$ and $S_{xy} = 1.69$, find correlation co-efficient.
- xii- What is the relation between regression co-efficient and correlation co-efficient?

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

(2 x 6 = 12)

- i- Define 2 x 2 contingency table.
- ii- Define Rank correlation.
- iii- What is "degree of freedom"?
- iv- Explain negative association between the attributes.
- v- Define Analysis of Time Series.
- vi- Define Seasonal Variations.
- vii- Given $\Sigma d^2 = 440$, $n = 11$. Find the value of Rank Correlation.
- viii- Define co-efficient of association.
- ix- What does it mean if ; $Q = 0$, $Q = +1$, $Q = -1$

(Turn over)

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(2)

SECTION II

- 5- (a) If 'x' is normally distributed with mean = 25 and variance = 16 then find the probabilities 4
 i. $P[x \geq 30]$ ii. $P[x \leq 16]$
 (b) A coin is tossed 400 times. Use the normal approximation to find the probability of obtaining 4
 i. Between 185 and 210 heads ii. Exactly 205 heads

- 6- (a) Take all possible samples of size 2 without replacement from the population 2, 6, 8, 12, 14. 4
 Form the sampling distribution of mean and verify that $\mu_{\bar{x}} = \mu$

- (b) The random variable 'x' has the following probability distribution 4

x	4	5	6	7
P(x)	0.2	0.4	0.3	0.1

Find $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$ for a random sample of size 36.

- 7- (a) Find 95% confidence interval for μ if a sample of 25 values gave a mean $\bar{X} = 83$. Given that 4
 population Standard Deviation is 7.
 (b) A sample of 12 values from a population gives mean $\bar{X} = 40$ and unbiased estimate of 4
 Variance $S^2 = 2.56$. Test the hypothesis at 5% level of significance that mean in the
 population is 44

- 8- (a) Given the following data : 4

$$n = 100$$

$$\Sigma xy = 300300$$

$$\Sigma x = 5000$$

$$\Sigma x^2 = 250400$$

$$\Sigma y = 6000$$

$$\Sigma y^2 = 360900$$

Calculate Regression equation taking 'x' as independent variable.

- (b) For a set of data we have 4

$$\Sigma(x - \bar{x})(y - \bar{y}) = 120$$

$$S_x = 3$$

$$\Sigma(y - \bar{y})^2 = 640$$

$$r = 0.5$$

Find the number of pair of values.

- 9- (a) In an investigation about Eye Colour and left or right handedness of a person, the following 4
 results were obtained:

Eye Colour	Handedness	
	Left	Right
Blue	15	85
Brown	20	80

Test the hypothesis that if there is any association between Eye Colour and Handedness at 5% level of significance.

- (b) Calculate 7 days moving averages for the following record of attendance: 4

Week	Days						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
I	24	55	29	48	52	55	61
II	27	52	32	43	53	56	65

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Roll No: _____

Gujranwala Board-2022

STATISTICS

Time: 20 Minutes

(INTER PART II)- 422-(III)

Code: 8185

OBJECTIVE

PAPER: II

Marks: 17

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. Use marker or pen to fill the circles. Cutting or filling two more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.



- 1- For the estimating regression equation $\hat{y} = a + bx$, the intercept is
(A) y (B) a (C) b (D) x
- 2- If the critical region is located in both sides of the distribution, it is called
(A) one-tailed (B) two-tailed (C) significance level (D) confidence level
- 3- The confidence coefficient is denoted by
(A) $1 - \beta$ (B) $1 - \alpha$ (C) α (D) β
- 4- The computer programs, in general, are called
(A) software (B) hardware (C) ROM (D) RAM
- 5- Graph of time series is called
(A) histogram (B) historiagram (C) trend line (D) bar diagram
- 6- If attributes A and B are independent, then the coefficient of association is equal to
(A) negative (B) zero (C) positive (D) 1
- 7- The normal distribution has _____ parameters.
(A) one (B) two (C) three (D) four
- 8- If the variable X increases and Y decreases, the coefficient of correlation will be
(A) positive (B) negative (C) zero (D) infinity
- 9- If a population has mean $\mu = 12$, what is the value of $\mu_{\bar{x}}$ for sample size $n = 20$?
(A) 10 (B) 12 (C) 14 (D) 16
- 10- In regression, the sum of deviations of observations from their estimated values is equal to
(A) -1 (B) zero (C) +1 (D) ∞
- 11- For the normal distribution $N(50, 100)$, the area to the left of $x = 50$ is
(A) 1.0 (B) 0.4765 (C) 0.50 (D) zero
- 12- For a contingency table of order $r \times c$, the number of degree of freedom is
(A) rc (B) $(r-1)c$ (C) $r(c-1)$ (D) $(r-1)(c-1)$
- 13- In the normal distribution $N(50, 100)$, mean deviation is equal to
(A) 4 (B) 6 (C) 8 (D) 10
- 14- A sample is a part of
(A) sampling (B) population (C) unit (D) error
- 15- A value calculated from population is called
(A) statistic (B) parameter (C) sampling error (D) bias
- 16- The estimation in which we find single value from sample data is called
(A) fractional estimation (B) point estimation
(C) interval estimation (D) confidence interval
- 17- The number of possible samples of size 'n' drawn with replacement from a population of size N is
(A) $N - n$ (B) $\frac{N-n}{N-1}$ (C) $N C_n$ (D) N^n

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SUBJECTIVE

Note: Section I is compulsory. Attempt any Three (3) questions from Section II.

SECTION I

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

(2 x 8 = 16)

- i- In a normal distribution, mean is 25 and standard deviation is 5, find mean deviation.
- ii- Write down the equation of standard normal distribution.
- iii- In a normal distribution, first and third quartiles are 65 and 75 respectively, find mean of this normal distribution.
- iv- What is the relation between mean, median and mode of a normal distribution?
- v- Why β_1 is zero in a normal distribution?
- vi- What is meant by statistical inference?
- vii- It is found that 6 children from a sample of 50 children from a large school are left handed. Obtain an unbiased estimate of proportion of left handed children in the school.
- viii- Define composite hypothesis.
- ix- Formulate the null and alternative hypothesis for the following statement.
"No more than 30% of the people pay Zakat"
- x- What is meant by critical region?
- xi- Define computer.
- xii- What is computer hardware?

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

(2 x 8 = 16)

- i- Define population.
- ii- Differentiate between parameter and statistic.
- iii- Write a note on sampling.
- iv- In a population $\mu = 50$ and $\sigma^2 = 250$, find the mean and variance for the distribution of \bar{X} if $n = 25$.
- v- If $N = 50$, $n = 10$, $\sigma = 4$, find $\sigma_{\bar{x}}^2$ if sampling is done with replacement.
- vi- Define sampling unit.
- vii- Define simple linear regression co-efficient.
- viii- What is meant by scatter diagram?
- ix- In regression y on x , if $a = 130$, $b = 3.956$ then what is the estimate of y for $x = 12$
- x- Describe perfect positive correlation.
- xi- Find correlation co-efficient from the following equations: $\hat{y} = 3 - 0.38x$, $\hat{x} = 1.5 - 0.27y$
- xii- Write any two formulas of correlation co-efficient.

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

(2 x 6 = 12)

- i- What is coefficient of association?
- ii- Define a contingency table.
- iii- Discuss positive association.
- iv- Given $n = 150$, $(A) = 30$, $(B) = 60$, find (AB) .
- v- Write down methods of measuring secular trend.
- vi- Discuss irregular movement with example.
- vii- Give two examples of seasonal variation in a time series.
- viii- What is decomposition of a time series?
- ix- A straight line is fitted to a time series $\hat{y} = 2 + 1.7x$, to the years 1990 to 1992 taking 1990 as origin, find the trend values.

(Turn over)

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SECTION II

- 5- (a) The heights of boys follow a normal distribution with mean 150.3 cm and standard deviation 5 cm. Find probability that a boy picked up at random from this age group has height 4
 (i) less than 158 cm (ii) more than 145 cm
- (b) In a normal distribution $\mu = 30$ and $\sigma = 5$, find two points containing middle 95% of area. 4
- 6- (a) A population consists of four values 0, 3, 6, 9. Take all possible samples of size 3 without replacement. Form the sampling distribution of \bar{X} and verify that 4
 (i) $\mu_{\bar{X}} = \mu$ (ii) $\sigma_{\bar{X}}^2 = \frac{\sigma^2}{n} \cdot \frac{N-n}{N-1}$
- (b) Let P_1 represents the proportion of odd numbers in a random sample of size $n_1 = 2$ with replacement from population 4 and 5. Similarly P_2 represents the proportion of odd numbers in a random sample of size $n_2 = 2$ with replacement from another population 2 and 3. Form sampling distribution of $P_1 - P_2$ and verify that $\mu_{P_1 - P_2} = \pi_1 - \pi_2$ 4
- 7- (a) Find a 95% confidence interval for population proportion. If 24 heads are obtained in 40 tosses of a coin. 4
- (b) A random sample of 64 has an average of 21.9 with a standard deviation of 1.42. Test the hypothesis that $\mu = 22.5$ against the alternative hypothesis $\mu < 22.5$ at 5% level of significance. 4
- 8- (a) For 9 observations on Supply (X) and Price (Y) the following data was obtained: 4
 $\sum (x-90) = -25$, $\sum (x-90)^2 = 301$
 $\sum (y-127) = 12$, $\sum (y-127)^2 = 1006$
 $\sum (x-90)(y-127) = -469$
 Obtain the estimated line of regression of X on Y and estimate the supply when price is Rs.125
- (b) Calculate the coefficient of correlation from the following data: 4
- | | | | | | | |
|---|----|----|----|----|----|----|
| X | 3 | 4 | 5 | 6 | 7 | 8 |
| Y | 25 | 24 | 20 | 20 | 19 | 17 |
- 9- (a) Find coefficient of association from the following table: 4
- | Height of Son | Height of Father | |
|---------------|------------------|-------|
| | Tall | Short |
| Tall | 500 | 100 |
| Short | 100 | 400 |
- (b) Fit a straight line $\hat{y} = a + bx$ for the years (2005—2015) both inclusive. 4
 Find out trend values of y
 $\sum X = 0$ $\sum Y = 438.9$ $\sum X^2 = 110$ $\sum XY = -84.4$

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. Use marker or pen to fill the circles. Cutting or filling two more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.



- 1- 1- Normal distribution have parameters
(A) three (B) four (C) two (D) one
- 2- In standard normal distribution mean and variance respectively are
(A) 0 & 1 (B) 0 & 3 (C) 0 & 5 (D) 0 & 2
- 3- Mean and variance of a normal distribution are
(A) n, np (B) np, npq (C) μ, σ^2 (D) μ, σ
- 4- Number of observations falling in a sample are called
(A) sample size (B) population size (C) sample frame (D) sample design
- 5- If sampling is done with replacement then total number of possible samples are
(A) N^n (B) ${}^N C_n$ (C) ${}^N P_n$ (D) Nn
- 6- $\mu_{\bar{x}} = \mu$ if sampling is done
(A) with replacement (B) without replacement (C) both A and B (D) neither A nor B
- 7- Any hypothesis which is accepted when null hypothesis is rejected is called
(A) simple (B) composite (C) alternative (D) statistical
- 8- Probability of rejecting H_0 when actually it is true is called
(A) α error (B) β error (C) level of confidence (D) level of significance
- 9- In estimation if we find single value then it is called
(A) interval estimation (B) point estimation
(C) confidence interval (D) interval estimator
- 10- The dependance of one variable to another variable is called
(A) regression (B) correlation (C) association (D) regression
- 11- Correlation co-efficient always lies between
(A) -1 and +1 (B) 0 and 1 (C) $-\infty$ to $+\infty$ (D) 3 and -3
- 12- Interdependance between two quantitative variables is called
(A) correlation (B) regression (C) association (D) estimation
- 13- Two attributes X and Y are called +vely associated
(A) $(XY) \neq \frac{(X)(Y)}{n}$ (B) $(XY) = \frac{(X)(Y)}{n}$ (C) $(X)(Y) > \frac{(X)(Y)}{n}$ (D) $(XY) < \frac{(X)(Y)}{n}$
- 14- Chi-square test is not used if any expected frequency is less than
(A) 10 (B) 5 (C) 3 (D) 15
- 15- The graph of time series is called
(A) histogram (B) historigram (C) ogive (D) pie-diagram
- 16- Damages due to floods, strikes and fires are
(A) irregular (B) regular (C) seasonal (D) cyclical
- 17- Computers which are commonly used in offices are called _____ computers.
(A) super (B) digital (C) analog (D) hybrid

SUBJECTIVE Gujranwala Board-2018

Note: Section I is compulsory. Attempt any Three (3) questions from Section II.

SECTION I**2. Write short answers to any Eight questions:**

(2 x 8 = 16)

- i- What are the values of two constants e and π in the equation of normal distribution?
- ii- In normal distribution mean = 40, find median and mode.
- iii- What is relation between binomial distribution and normal distribution?
- iv- Write the equation of normal distribution with mean = 30 and SD = 10.
- v- If X is $N(25, 25)$ find the value of maximum ordinate.
- vi- Define biased estimator.
- vii- Define confidence limits.
- viii- Define level of significance.
- ix- Define region of acceptance.
- x- What is meant by critical region?
- xi- Define hardware and software.
- xii- What is CPU?

**3. Write short answers to any Eight questions:**

(2 x 8 = 16)

- i- Write any two advantages of sampling.
- ii- What is the term bias in sampling?
- iii- Explain the term probability sampling.
- iv- Give $\pi_1 = \frac{2}{3}$, $n_1 = 2$ and $\pi_2 = \frac{1}{2}$, $n_2 = 2$. Find $\text{var}(\hat{p}_1 - \hat{p}_2)$
- v- Find $\sigma_{\bar{x}}$ if $N = 6$, $n = 2$, $\sigma = 4$. For sampling with and without replacement.
- vi- Write any two purposes of sampling.
- vii- Given $b_{yx} = -1.4$ and $b_{xy} = -0.87$ Find (r) .
- viii- Give two properties of coefficient of correlation.
- ix- Given $n = 15$, $S_x = 7.933$, $S_y = 16.627$, $\sum (x - \bar{x})(y - \bar{y}) = 148$ compute b_{yx} .
- x- Define independent variable in regression model.
- xi- Sketch scatter diagram indicating positive correlation.
- xii- What is meant by residual (error) in regression model?

4. Write short answers to any SIX questions:

(2 x 6 = 12)

- i- Define association of attributes.
- ii- What is Rank correlation?
- iii- What is ultimate class frequency?
- iv- What is order of the class?
- v- Determine whether two attributes are independent or associated
 $N = 1024$, $(A) = 144$, $(B) = 384$, $(AB) = 54$
- vi- Define histogram.
- vii- What is meant by analysis of time series?
- viii- Define secular trend.
- ix- Give two examples of seasonal movements.

SECTION II

- 5- (a) In a normal distribution $\mu = 20$ and $\sigma^2 = 16$. Find two points containing the middle 90 % area.
- (b) In a normal distribution lower and upper quartiles are 25 and 35. Find the probability that (i) $P(X < 19)$ (ii) $P(X < 35)$

(Turn over)

Gujranwala Board-2018

- 6- (a) If the mean and variance of a population are 20 and 4 respectively, What would be the mean and $S.E(\bar{x})$ if the samples are drawn with replacement of size 5.

- (b) Draw all possible samples of size 3 without replacement from population i.e. 2, 4, 5, 7, 10.

Find the sample proportion (\hat{p}) of prime numbers in each sample. Verify that

(i) $\mu_{\hat{p}} = P$ and $\sigma_{\hat{p}}^2 = \frac{Pq}{n} \cdot \frac{N-n}{N-1}$



- 7- (a) Calculate 95 % confidence interval for population mean.

Given that $\sigma^2 = 49$, $n = 25$, $\bar{X} = 83$

- (b) A basket ball player has hit on 80 % of his shots from the floor. If on the next 100 shots he makes 70 baskets, would you say that his shooting has improved $\alpha = 5\%$

- 8- (a) Given the following information:

$$n = 15, \quad \bar{x} = 25, \quad \bar{y} = 18, \quad \sum (x - \bar{x})^2 = 136, \quad \sum (y - \bar{y})^2 = 138$$

$$\sum (x - \bar{x})(y - \bar{y}) = 122$$

Compute the regression line Y on X and estimate Y when $X = 24$

- (b) Compute the coefficient of correlation between X and Y for the information given in part (a)

- 9- (a) The following table gives the condition at home and condition of the children:

Condition of children	Condition at home	
	Clean	Not clean
Clean	175	143
Fairly clean	136	116
Dirty	125	145

Test for the association between the condition at home and condition of children.

- (b) Compute 3-years moving average from the data given below:

Years	1992	1993	1994	1995	1996
Sales	2.4	2.8	3	3.5	4

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