Roll No. _____

STATISTICS **(INTER PART II)- 422-(III)** **PAPER: II**
Time: 20 Minutes **Code: 8185** **Marks: 17**
OBJECTIVE GUJ-22

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) historigram (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 x 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}

STATISTICS **(INTER PART II)- 422** **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. 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 $\sigma^2_{\bar{x}}$ 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)

SECTION II

GUJ-22

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 that 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) $\sigma^2_{\bar{x}} = \frac{\sigma^2}{n} \cdot \frac{N-n}{N-1}$

(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

$\sum(x-90) = -25, \quad \sum(x-90)^2 = 301$

$\sum(y-127) = 12, \quad \sum(y-127)^2 = 1006$

$\sum(x-90)(y-127) = -469$

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. Find out trend values of y 4

$\sum X = 0 \quad \sum Y = 438.9 \quad \sum X^2 = 110 \quad \sum XY = -84.4$