

Roll No \_\_\_\_\_ (To be filled in by the candidate)

(Academic Sessions 2019 – 2021 to 2021 – 2023 )

**STATISTICS**

223-1<sup>st</sup> Annual-(INTER PART – II)

Time Allowed : 20 Minutes

Q. PAPER – II ( Objective Type )

**PAPER CODE = 8185**

Maximum Marks : 17

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

|     |                                                                                                                                                                          |           |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1-1 | Simple linear regression model contains :<br>(A) One variable (B) Two variables<br>(C) Three variables (D) More than three variables                                     | LH2-12-23 |
| 2   | The difference between statistic and parameter is called :<br>(A) Random error (B) Sampling error<br>(C) Standard error (D) Non sampling error                           |           |
| 3   | The value of $\chi^2$ is always :<br>(A) -1 to +1 (B) Zero (C) Positive (D) Negative                                                                                     |           |
| 4   | The normal distribution is :<br>(A) Continuous (B) Discrete (C) Positively skewed (D) Negatively skewed                                                                  |           |
| 5   | A set of instructions that run the computer is :<br>(A) Hardware (B) Printers (C) Software (D) Monitors                                                                  |           |
| 6   | A formula or function used to estimate a parameter is called :<br>(A) Estimate (B) Bias (C) Estimator (D) Estimation                                                     |           |
| 7   | A part of population is called :<br>(A) Parameter (B) Statistic (C) Sample (D) Sampling                                                                                  |           |
| 8   | The range of normal distribution is :<br>(A) 0 to $\infty$ (B) $-\infty$ to 0 (C) $-\infty$ to $\infty$ (D) 0 to $-\infty$                                               |           |
| 9   | In the least squares regression line $y = a + bx$ , the slope is :<br>(A) b (B) zero (C) X (D) a                                                                         |           |
| 10  | Decomposition of time series is called :<br>(A) Analysis of time series (B) Histogram<br>(C) Historigram (D) Detrending                                                  |           |
| 11  | Which of the following can be alternative hypothesis $H_1$ :<br>(A) $\theta \leq \theta_0$ (B) $\theta \geq \theta_0$ (C) $\theta = \theta_0$ (D) $\theta \neq \theta_0$ |           |
| 12  | In sampling with replacement, a sampling unit can be selected :<br>(A) Only once (B) Only twice (C) Less than once (D) More than once                                    |           |
| 13  | A sudden decrease in supplies due to floods is an example of :<br>(A) Secular trend (B) Seasonal variations<br>(C) Cyclical variations (D) Irregular variations          |           |
| 14  | The point estimate of $\mu$ is :<br>(A) $\bar{X}$ (B) $\sigma$ (C) $\mu$ (D) $\sigma^2$                                                                                  |           |
| 15  | In case of symmetrical distribution :<br>(A) $\mu_1 = \mu_2$ (B) $\mu_3 = \mu_4$ (C) $\beta_1 = \beta_2$ (D) Mean = Median = Mode                                        |           |
| 16  | Co-efficient of correlation (r) lies between :<br>(A) 0 and 1 (B) -1 and 0 (C) $-\infty$ to $+\infty$ (D) -1 and +1                                                      |           |
| 17  | A $4 \times 5$ contingency table consists of :<br>(A) 9 cells (B) 20 cells (C) 12 cells (D) 18 cells                                                                     |           |

**SECTION – I** CHH-12-23

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

16

- (i) Give any two area relations in normal distribution.
- (ii) What is relation between M.D and S.d of normal distribution?
- (iii) Show that in standard normal distribution  $Q.D = Q_3$
- (iv) For  $Z \sim N(0, 1)$ , calculate  $P(-1.96 < Z < 1.96)$ .
- (v) What are the parameters of normal distribution?
- (vi) Define interval estimation.
- (vii) Given  $n = 64$ ,  $\bar{X} = 42.7$ ,  $\sigma = 8$  and  $Z_{\alpha/2} = 1.645$ , find C.I for  $\mu$ .
- (viii) Which test is powerful test?
- (ix) Differentiate between null and alternative hypothesis.
- (x) What is meant by critical values?
- (xi) Define input and output devices.
- (xii) What is software?

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

16

- (i) Define finite population.
- (ii) What is sampling frame?
- (iii) What is simple random sampling?
- (iv) Explain the term sampling units.
- (v) Define cluster sampling.
- (vi) Write two objectives of sampling.
- (vii) What is meant by regression?
- (viii) Define slope of the straight line.
- (ix) If  $a = 130$ ,  $b = 3.956$  then estimate  $y$  for  $x = 12$
- (x) Define scatter diagram.
- (xi) What is negative correlation?
- (xii) If  $\hat{y} = 30 - 2x$  and  $\hat{x} = 20 - 0.01y$ , find " $r$ "

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

12

- (i) How are association and correlation different from each other?
- (ii) Define association. Give two real life examples of association.
- (iii) Calculate the value of rank correlation coefficient if  $6\sum d^2 = n(n^2 - 1)$ . Comment it.
- (iv) Define time series. Give any one real life example of a time series.
- (v) What sort of variation was related to corona? Also name the four types of variations in a time series.
- (vi) Find trend using method of semi-average for a time series  $y = 4, 4, 4, 4, 4$  for the year 2000 to 2004.
- (vii) Write one advantage and one disadvantage of moving-average method.
- (viii) Linear trend for the year 2015 -2019 is  $\hat{y} = 3 + 5x$ . Find trend value for the year 2020. Origin was 2017.
- (ix) Interpret  $a$  and  $b$  in a linear trend  $\hat{y} = a + bx$  for the year 2016-2020.

(Turn Over)

(2)

## SECTION - II

LHR-12-23

**Note : Attempt any THREE questions.**

5. (a) In a normal distribution 33% of the values are under 48 and 12.3% are over 60, find mean and standard deviation of the distribution. 4

(b) The 90<sup>th</sup> percentile of a normal distribution is 50, while the 15<sup>th</sup> percentile is 25, find  $\mu$  and  $\sigma$  4

6. (a) Draw all possible samples of two letters each without replacement from the letters of the word "PUNJAB". Find proportion of the letter 'A' in each sample. Make a sampling distribution of sample proportion and verify  $\mu_{\hat{p}} = \pi$  4

(b) A population consists of values 2, 4, 6, 8. Draw all possible samples of size 2 without replacement from this population and show that :

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

7. (a) A random sample of 250 from the 5000 students in Govt. College, Gujranwala contained 30 left-handed students. Give an approximate 95% confidence interval for the proportion of left-handed students in the college. 4

(b) A sample of 400 male students is found to have a mean height of 67.47 inches. Can it be regarded as a simple random sample from a large population with mean height 67.39 with standard deviation of 1.3 inches? 4

8. (a) A random sample of 5 pairs of observations  $(x_i, y_i)$  is given below : 4

|       |    |   |    |   |    |
|-------|----|---|----|---|----|
| $x_i$ | 3  | 2 | 5  | 1 | 4  |
| $y_i$ | 13 | 9 | 27 | 8 | 18 |

Determine the least square linear regression  $\hat{y}_i = a + bx_i$  and estimate  $y$  for  $x = 6$

(b) For a set of 22 pairs of observations, we have  $\Sigma x_i = 983$ ,  $\Sigma y_i = 409$ ,  $\Sigma x_i^2 = 61339$ ,  $\Sigma y_i^2 = 8475$ ,  $\Sigma x_i y_i = 15811$ . Find product moment correlation co-efficient for the data. 4

9. (a) Test the association between the subject and results from the following data : 4

| Subjects | Pass | Fail |
|----------|------|------|
| Maths    | 60   | 40   |
| Stats    | 100  | 80   |
| Eco      | 120  | 100  |

(b) Find the trend values by using 3-days moving average of following data : 4

| Days   | Sun | Mon | Tue | Wed | Thur | Fri | Sat | Sun |
|--------|-----|-----|-----|-----|------|-----|-----|-----|
| Values | 120 | 140 | 135 | 118 | 129  | 130 | 150 | 140 |