Roll No _____ (To be filled in by the candidate)

(Academic Sessions 2019 – 2021 to 2021 – 2023)

STATISTICS 223-1st 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 : LHR-12-23 (A) One variable (B) Two variables (C) Three variables (D) More than three variables
2	The difference between statistic and parameter is called : (A) Random error (B) Sampling error (C) Standard error (D) Non sampling error
3	The value of χ^2 is always : (A) -1 to $+1$ (B) Zero (C) Positive (D) Negative
4	The normal distribution is : (A) Continuous (B) Discrete (C) Positively skewed (D) Negatively skewed
5	A set of instructions that run the computer is : (A) Hardware (B) Printers (C) Software (D) Monitors
6	A formula or function used to estimate a parameter is called : (A) Estimate (B) Bias (C) Estimator (D) Estimation
7	A part of population is called : (A) Parameter (B) Statistic (C) Sample (D) Sampling
8	The range of normal distribution is : (A) 0 to ∞ (B) $-\infty$ to 0 (C) $-\infty$ to ∞ (D) 0 to $-\infty$
9	In the least squares regression line $y = a + bx$, the slope is : (A) b (B) zero (C) X (D) a
10	Decomposition of time series is called : (A) Analysis of time series (B) Histogram (C) Historigram (D) Detrending
11	Which of the following can be alternative hypothesis H_1 : (A) $\theta \leq \theta_o$ (B) $\theta \geq \theta_o$ (C) $\theta = \theta_o$ (D) $\theta \neq \theta_o$
12	In sampling with replacement, a sampling unit can be selected : (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 : (A) Secular trend (B) Seasonal variations (C) Cyclical variations (D) Irregular variations
14	The point estimate of μ is : (A) $\bar{X}$ (B) σ (C) μ (D) σ^2
15	In case of symmetrical distribution : (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 : (A) 0 and 1 (B) -1 and 0 (C) $-\infty$ to $+\infty$ (D) -1 and $+1$
17	A 4×5 contingency table consists of : (A) 9 cells (B) 20 cells (C) 12 cells (D) 18 cells

Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2019 – 2021 to 2021 – 2**

STATISTICS 223-1st Annual-(INTER PART – II) Time Allowed : 2.40 hou

PAPER – II (Essay Type) Maximum Marks : 68

SECTION – I CHR-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 ~ 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, $\overline{X} = 42.7$, $\sigma = 8$ and $Z_{\alpha/2} = 1.645$, find C.I for μ.

(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 $6\Sigma d^2 = n(n^2 - 1)$. 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)

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 90th percentile of a normal distribution is 50, while the 15th percentile is 25, find μ and σ 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 :

$$\sigma_{\bar{x}}^2 = \frac{\sigma^2}{n} \cdot \frac{N-n}{N-1}$$ 4

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