

## Sargodha Board-2024

1224 Warning:- Please write your Roll No. in the space provided and sign. Roll No-----  
( Inter Part – II) (Session 2020-22 to 2022-24) Sig. of Student -----

Statistics (Objective)

Commerce Group

Paper (II)

Time Allowed:- 15 minutes

**PAPER CODE 4641**

Maximum Marks:- 10

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. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1



1) A numerical quantity Computed from sample

- (A) Population (B) Parameter (C) Observation (D) Statistic

2) Graph of Time Series is known as

- (A) Histogram (B) Polygon (C) Ogive (D) Frequency Curve

3) Total angle of Pie chart is

- (A)  $180^\circ$  (B)  $300^\circ$  (C)  $360^\circ$  (D)  $90^\circ$

4) Arithmetic Mean is based on

- (A) Small Values (B) All Values (C) Large Values (D) Middle Values

5) Mode of Word "PAKISTAN" is

- (A) No Mode (B) P (C) K (D) A

6) If  $\sum(X - 20) = 0$  then  $\bar{X} =$

- (A) 10 (B) Insufficient Information (C) 20 (D) 40

7) In chain base method, The base Period is

- (A) Normal year (B) Not Fixed (C) One (D) Always 100

8) The most suitable average for Index Number is

- (A) G.M (B) A.M (C) Median (D) Mode

9) Probability of getting Six when a die is rolled once is

- (A)  $\frac{6}{6}$  (B)  $\frac{1}{6}$  (C)  $\frac{2}{6}$  (D)  $\frac{3}{6}$

10) Ordered arrangement of objects is known as

- (A) Combination (B) Factorial (C) Permutation (D) Sample Space

2. Answer briefly any SIX parts from the followings:- 6×2=12

- (i) What is meant by population? (ii) Name the four main departments where statistics is applied?  
(iii) What is secondary data? Explain it with example. (iv) What are the different methods of presentation of data?  
(v) Define Pie chart. (vi) What is frequency Polygon?  
(vii) Define permutations with example. (viii) What is the answer of  ${}^6C_4$  and  ${}^6P_4$ ?  
(ix) A box contains 7 red and 4 black balls. Find the probability of  
(a) One red ball (b) One green ball.



3. Answer briefly any SIX parts from the followings:- 6×2=12

- (i) Give two properties of Arithmetic Mean? (ii) For skewed distribution find the value of Mean if median = 17, Mode = 26?  
(iii) Compute median if  $\ell = 50$   $h = 10$   $f = 20$  (iv) Find Mode of word "STATISTICS"  
 $n = 100$   $c = 80$ ?  
(v) Define Mode? (vi) Give various methods of Computing Arithmetic Mean?  
(vii) What is meant by term Composite index Number. (viii) Define the term base period. Name the methods of base period?  
(ix) What is Simple average of relatives?

### Section ----- II

Note: Attempt any Two questions.

(8 × 2 = 16)

4.(a) Construct a frequency distribution table. Starting with intervals 0 – 9, 10 – 19, ... etc. From the following mathematics by 50 students.

40 28 11 47 15 45 52 53 61 39 32 24 0 23 32 26 50 80 54 44  
65 31 06 27 0 31 42 74 37 68 0 15 14 19 23 30 34 38 50 50  
11 05 22 07 36 25 93 69 31 55

(b) Construct a graph of Histogram on the basis of the following data?

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
Production	15	25	30	48	32	35	28	36	50

5. (a) Compute Arithmetic mean for the following data if  $d = x - 15$

d	-12	-8	-4	0	4	8	12
f	2	5	8	18	10	6	1

(b) Find Median for the following data

Marks	10-19	20-29	30-39	40-49	50-59
f	4	21	55	17	3

6.(a) Find the index number of prices from the following data taking

(i) Year 2014 as base (ii) Average prices of all years as the base

Year	2014	2015	2016	2017	2018	2019	2020
Price	20	22	25	30	36	40	44

(b) If a die is rolled once, what is the probability of getting (i) Prime number (ii) Even number



Statistics (Objective)

Sargodha Board-2023

Paper (II)

Time Allowed:- 20 minutes

PAPER CODE 4181

Maximum 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. Write PAPER CODE, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1. The range of Normal distribution is:  
(A) 0 to n (B) 0 to  $+\infty$  (C) -1 to +1 (D)  $-\infty$  to  $+\infty$
2. The Normal distribution has \_\_\_\_\_ parameters:  
(A) One (B) Two (C) Three (D) Four
3. The total area under the Normal curve is:  
(A) 0.5 (B) 0.75 (C) 1.0 (D) 1.50
4. Any measure calculated from sample is called:  
(A) Parameter (B) Statistic (C) Error (D) Population
5. The difference between statistic and parameter is called:  
(A) Probability (B) Sampling error (C) random (D) Non-random
6. The mean of Sampling distribution of means is equal to:  
(A)  $\bar{X}$  (B)  $\mu$  (C) P (D)  $\sigma$
7. Estimate and estimator are:  
(A) Same (B) Maximum (C) Minimum (D) Different
8.  $(1 - \alpha)$  is called:  
(A) Critical value (B) Level of significance (C) Level of confidence (D) Interval estimate
9. If  $H_0$  is true and we reject it is called:  
(A) type-I error (B) type-II error (C) Standard error (D) Sampling error
10. The two regression lines always passes through:  
(A) (X,Y) (B) (a,b) (C)  $(\bar{X}, \bar{Y})$  (D)  $(\bar{X}, Y)$
11. If  $\hat{Y} = 2 + 0.6X$ , then the value of slope is equal to:  
(A) 0.6 (B) 2 (C) 0 (D) 1
12. The correlation coefficient is always lies between:  
(A)  $-\infty$  to  $+\infty$  (B) 0 to n (C) 0 to  $+\infty$  (D) -1 to +1
13. Association measures strength of relationship between:  
(A) Variables (B) Constant (C) Attributes (D) Regression
14. For  $3 \times 3$  contingency table, the degrees of freedom is equal to:  
(A) 4 (B) 3 (C) 9 (D) 6
15. The multiplicative model of time series is:  
(A)  $Y = T + S + C + I$  (B)  $Y = TS CI$  (C)  $Y = a + bx$  (D)  $Y = a + bx + cx^2$
16. Movement in secular trend is:  
(A) Regular (B) Irregular (C) Fixed (D) Random
17. Programs in general are referred to as:  
(A) Software (B) Hardware (C) Floppy disk (D) Hard disk



**Warning:- Please, do not write anything on this question paper except your Roll No.**

**1223 (Inter Part-II)**

**(Session 2019 – 21 to 2021 – 23 )**

**Statistics (Subjective)**

**Time Allowed: 2.40 hours**

**SECTION ----- I**

**Paper (II)**

**Maximum Marks: 68**

**8 × 2 = 16**

**2. Write short answers of any eight parts.**

- (i) What is the range of normal distribution? (ii) What is the relation between mean, median and mode of normal distribution? (iii) Define normal frequency distribution. (iv) In a normal distribution, mean is 100 and standard deviation is 10, Find quartile deviation of normal distribution. (v) In a normal distribution  $\mu_2=4$ , Find third and fourth moments about mean. (vi) Define interval estimation. (vii) what is meant by unbiased estimator? (viii) Distinguish between simple and composite hypothesis. (ix) What is meant by level of significance? (x) Define type-II error. (xi) Describe the types of computer. (xii) What is computer hardware?

**3. Write short answers of any eight parts.**

**8 × 2 = 16**

- (i) Define sample and sampling. (ii) What are the properties of sampling with replacement? (iii) Why random sampling is used? (iv) What is bias? (v) If  $n=25$  and  $\delta_{\bar{x}}=5$ , Find  $\delta^2$ . (vi) Given  $\delta_1^2=150$ ,  $\delta_2^2=180$ ,  $n_1=30$ ,  $n_2=30$  Find  $\delta_{\bar{x}_1-\bar{x}_2}$  (vii) How will you describe simple linear regression model? (viii) Explain the co-efficient of regression. (ix) Define regressand and regressor. (x) What does the value of " $\gamma$ " indicates? (xi) Under what situations rank correlation is used? (xii) Given  $\gamma_{xy} = -0.87$ ,  $b_{yx} = -1.4$ . Find  $b_{xy}$ .

**4. Write short answers of any six parts.**

**6 × 2 = 12**

- (i) Distinguish between variable and an attribute. (ii) Define independence of an attribute. (iii) Define positive and Negative association. (iv) Define term "Time Series". (v) Enlist methods of secular trend. (vi) What is Seasonal Variation? (vii) Define term "Signal". (viii) What are four phases of business Cycle? (ix) What is Moving average?

**SECTION ----- II**

**Note: Attempt any three questions. Each question carries equal marks.**

**(8 × 3 = 24)**

5. (a) If  $X \sim N(36, 49)$  find  $P(X < 32)$ ,  $P(X > 41)$  and  $P(30 < X < 40)$ .  
 (b) If  $X \sim N(49, 64)$  find the two points containing the middle 95% area under the normal curve.
6. (a) A population consists of values 3, 5, 7 and 9. Take all possible simple random samples of size 2 without replacement. Form the sampling distribution of sample mean and show that  $\mu_{\bar{x}} = \mu$   
 (b) If the size of simple random sample from an infinite population is 55, the variance of sample mean is 27. What must be the standard Error of sample mean if  $n=165$ .
7. (a) A random sample of size  $n=100$  from a normal population yielded the sample mean  $\bar{X}=190$  and  $S=800$ . Find 95% confidence interval for  $\mu$ .  
 (b) Samples of two types of electric light bulbs were tested for length of life and the following data were recorded.  
 Type I  $n_1=5$ ,  $\bar{X}_1 = 1224$ ,  $\sum (X_1 - \bar{X}_1)^2 = 6484$ . Type II  $n_2=7$ ,  $\bar{X}_2=1036$ ,  $\sum (X_2 - \bar{X}_2)^2 = 11200$ . Is the difference in the mean significant? Assume that the population of two types have the same variance. Use  $\alpha = 0.05$ .
8. (a) Given the following data.

<b>x</b>	0	1	2	3	4
<b>y</b>	1.0	1.8	3.3	4.5	6.3

Determine the regression line taking  $x$  as independent variable.

- (b) For a set of 22 pairs of observations, we have  
 $\sum x = 983$ ,  $\sum y = 409$ ,  $\sum x^2 = 61339$ ,  $\sum y^2 = 8475$ ,  $\sum xy = 15811$   
 Find the correlation coefficient for the data.
9. (a) Find co-efficient of association from the following data.

Attribute	Attacked	Not attacked
Inoculated	528	25
Not inoculated	790	175

- (b) For the following time series, determine the trend by using the method of 3-year moving average

Year	2001	2002	2003	2004	2005	2006	2007
Value	2	4	6	8	7	6	8



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. Write PAPER CODE, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed. Q. 1

1. The range of normal distribution is  
(A) 0 to  $\infty$  (B)  $-\infty$  to 0 (C)  $-\infty$  to  $+\infty$  (D) 0 to n
2. The number of parameters of normal distribution is  
(A) One (B) Two (C) Three (D) Four
3. The normal distribution has maximum ordinate at  $X =$   
(A)  $\mu$  (B)  $\sigma$  (C) 1 (D) 0
4. The numerical value computed from sample is called  
(A) Population (B) Statistic (C) Constant (D) Variable
5. In sampling without replacement  
(A)  $n \leq N$  (B)  $n > N$  (C)  $n \neq N$  (D)  $N \leq n$
6. In sampling with replacement a sampling unit may appear in the sample  
(A) Only once (B) More than once (C) Less than once (D) None of these
7. When  $H_0: \mu \geq \mu_0$  then  $H_1$  is  
(A)  $\mu \neq \mu_0$  (B)  $\mu > \mu_0$  (C)  $\mu < \mu_0$  (D)  $\mu \leq \mu_0$
8. Which of the following is simple hypothesis  
(A)  $\mu < 15$  (B)  $\mu > 15$  (C)  $\mu \neq 15$  (D)  $\mu = 15$
9. A specific value computed by using sample data is  
(A) Estimator (B) Estimate (C) Estimation (D) Bias
10. In regression  $\sum Y$  is equal to  
(A) 0 (B)  $\sum Y$  (C)  $\sum Y^2$  (D)  $bX$
11. Two variables are uncorrelated then the value of r is  
(A) -1 (B) 0 (C) +1 (D) Fractional
12. The sample correlation co-efficient is denoted by  
(A)  $r$  (B)  $r^2$  (C)  $\beta$  (D)  $\theta$
13. The strength of relation between attributes is  
(A) Association (B) Correlation (C) Regression (D) +vely associated
14. The range of rank correlation co-efficient is  
(A) -1 to 0 (B) 0 to 1 (C) -1 to +1 (D)  $-\infty$  to  $+\infty$
15. The graph of time series is called  
(A) Historigram (B) Ogive (C) Scatter diagram (D) Histogram
16. The increased demand of air cooler in summer season is  
(A) Trend (B) Seasonal (C) Cyclical (D) Irregular
17. Which of these is not output device  
(A) Monitor (B) Scanner (C) Printer (D) Speaker



## 2. Write short answer of any eight parts.

 $8 \times 2 = 16$ 

- (i) If  $X \sim N(24, 16)$ , then find quartiles  $Q_1, Q_2, Q_3$ . (ii) If  $X \sim N(15, 4)$ , then find the value of  $Z$  if  $X = 18$ .  
 (iii) Find maximum ordinate of the normal curve If  $\sigma = 4$ . (iv) Find the standard deviation for a normal distribution. If Quartile deviation is '6'. (v) Write any four properties of normal distribution. (vi) Define the term Estimation. (vii) What is meant by point estimator? (viii) What is meant by type-I error?  
 (ix) Define the term test statistic. (x) What are the critical values for test statistic? (xi) What is Central Processing unit? (xii) What is a language translator?

## 3. Write short answer of any eight parts

 $8 \times 2 = 16$ 

- (i) Explain the term target population. (ii) What is sampling. (iii) What is sampling error. (iv) Explain the term Non-probability sampling. (v) What is parameter and statistic. (vi) Name four probability sampling techniques. (vii) Explain the term regressor. (viii) Find the Y-intercept and slope of the line  $\hat{Y} = 5 - 2X$ . (ix) Define the term coefficient of correlation. (x) Differentiate between regression and correlation. (xi) Let  $S_{xy} = 30$ ,  $S_x = 2.5$ ,  $S_y = 20$  find  $\rho$ . (xii) When correlation between X and Y will be positive and negative.

## 4. Write short answer of any six parts.

 $6 \times 2 = 12$ 

- (i) Define co-efficient of association. (ii) Discuss Positive and Negative levels of Attributes. (iii) For a Given data if  $(AB) = 110$ ,  $(\alpha B) = 90$ ,  $(A\beta) = 290$ ,  $(\alpha\beta) = 510$  Discuss Association. (iv) Define Contingency table. (v) Define rank correlation co-efficient. (vi) What are the phases of a business cycle? (vii) Give two examples of seasonal variations. (viii) What is forecasting? (ix) Define signal and Noise?

## SECTION ----- II

**Note:** Attempt any three questions. Each question carries equal marks.  $(8 \times 3 = 24)$ 

5. (a) For a certain normal distribution the first moments about 10 is 40 and Fourth moments about 50 is 48. Find its mean and S.D.  
 (b) In a normal distribution, 3% items are under 45 and 8% are over 64. Find mean and S.D.  
 6. (a) Draw all possible samples of size 2 without replacement from a population consisting of 3, 6, 9, 16, from the sampling distribution of mean and verify results.

$$(i) \mu_{\bar{x}} = \mu \quad (ii) \sigma_{\bar{x}}^2 = \frac{\sigma^2}{n} \frac{N-n}{N-1}$$

- (b) Given that  $n_1 = 2$ ,  $\mu_1 = 6$ ,  $\sigma_1^2 = 2.67$ ,  $n_2 = 2$ ,  $\mu_2 = 6$ ,  $\sigma_2^2 = 0.67$  calculate

$$(i) \mu_{\bar{x}_1 - \bar{x}_2} \quad (ii) \sigma_{\bar{x}_1 - \bar{x}_2}^2 \text{ If sampling is done with replacement.}$$

7. (a) A random sample of size  $n = 400$  selected from a population of  $N = 10,000$  with  $\sigma^2 = 100$ . The sample mean is found to be  $\bar{X} = 80$ . Construct a 95% confidence interval for  $\mu$ .  
 (b) Test the null hypothesis  $H_0: \mu = 100$  against alternative hypothesis  $H_1: \mu < 100$  at  $\alpha = 5\%$  using the data given in Part (a).  
 8. (a) Compute the regression co-efficients  $n = 15$ ,  $S_x = 7.933$ ,  $S_y = 16.627$ ,  $\sum(X - \bar{X})(Y - \bar{Y}) = 148$   
 (b) For a given set of data, we have  $r = 0.60$ ,  $S_x = 1.50$ ,  $S_y = 2.0$ ,  $\bar{X} = 10$ ,  $\bar{Y} = 20$  Find the equations of the two regression lines of Y on X and X on Y.  
 9. (a) From the following table, test the hypothesis that the flower colour is independent of flatness of leaf. Use  $\alpha = 0.05$

	Flat Leaves	Lean Leaves
White Flowers	19	16
Red Flowers	20	15

- (b) Fit a linear trend to the following information for the years 1986 to 1992 (Both inclusive)  
 $\sum X = 0$ ,  $\sum Y = 245$ ,  $\sum X^2 = 28$ ,  $\sum XY = 66$  Also compute trend values.