

**INTERMEDIATE PART-II (12<sup>th</sup> CLASS)****STATISTICS PAPER-II (NEW SCHEME)**

TIME ALLOWED: 2.40 Hours

**SUBJECTIVE**

MAXIMUM MARKS: 68

**NOTE: - Write same question number and its part number in answer book, as given in the question paper.****SECTION-I****2. Attempt any eight parts.****8 × 2 = 16**

- (i) Write down any two properties of normal distribution.
- (ii) In normal distribution  $\mu_2 = 16$  find the value of  $\mu_4$ .
- (iii) In normal distribution  $\sigma^2 = 15$  find the value of  $\beta_1$  and  $\beta_2$ .
- (iv) In normal distribution  $Q_1 = 8$  and  $Q_3 = 17$  find Mean and Mode.
- (v) Write the equation of standard normal distribution.
- (vi) What is meant by testing of hypothesis?
- (vii) Define simple and composite hypotheses.
- (viii) Define level of significance.
- (ix) Find the value of  $t$  (test statistic) if  $n = 20$ ,  $\bar{X} = 4$ ,  $s = 3$ ,  $\mu = 4$
- (x) Define point estimation.
- (xi) What is computer?
- (xii) What is compiler?

**3. Attempt any eight parts.****8 × 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) Define Parameter and Statistic.
- (vi) What is sampling distribution?
- (vii) Explain the term Regressor.
- (viii) Find  $Y$ -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 'r'
- (xii) When correlation between  $X$  and  $Y$  will be positive and negative?

**4. Attempt any six parts.****6 × 2 = 12**

- (i) What are the four components of time series?
- (ii) What is meant by business cycle?
- (iii) Give two examples of secular trend.
- (iv) Discuss the purpose of time series.
- (v) Write two normal equations of simple linear regression equation  $\hat{Y} = a + bX$
- (vi) Explain the terms positive and negative association.
- (vii) Interpret the meaning of coefficient of association  $Q$ , when  $Q = 0.98$
- (viii) What is degree of freedom in  $3 \times 3$  contingency table?
- (ix) Find the coefficient of rank correlation if  $\sum d^2 = 80$  and  $n = 10$

**SECTION-II****NOTE: - Attempt any three questions.****3 × 8 = 24**

- 5.(a) In a normal distribution  $\mu = 47.6$  and  $\sigma = 16.2$ , find
- (i) The probability that a single observation will be greater than 60
- (ii) Two points such that any value has 95 % probability of falling between them 4
- (b) In a Normal Distribution mean is 50 and variance is 100. Find the area (i) Below 40 4  
(ii) Between 30 and 56
- 6.(a) Draw all possible sample of size 2 without replacement from the population 3, 7, 9, 11 show that: 4
- (i)  $\mu_{\bar{x}} = \mu$  (ii)  $\sigma_{\bar{x}}^2 = \frac{\sigma^2}{n} \left( \frac{N-n}{N-1} \right)$
- (b) If  $n_1 = 10, n_2 = 15$  4  
 $\mu_1 = 30, \mu_2 = 10$   
 $\sigma_1^2 = 5, \sigma_2^2 = 6$   
Find (i)  $\mu_{\bar{x}_1 - \bar{x}_2}$  (ii)  $\sigma_{\bar{x}_1 - \bar{x}_2}$
- 7.(a) A random sample of 75 students is selected and 16 are found to have cars on campus. Use 95% confidence interval to estimate the fraction of students who have cars on campus. 4
- (b) Ten students spend the following time in hours of their studies during a week 35, 40, 17, 23, 50, 45, 30, 20, 18 and 22. Test the hypothesis  $\mu \leq 20$  at  $\alpha = 0.05$  4
- 8.(a) Compute the regression coefficients for the information given below: 4  
 $\sum(x - \bar{x})(y - \bar{y}) = 148, S_x = 7.933, S_y = 16.627$  and  $n = 15$ .
- (b) If  $n = 5, \sum(x - \bar{x})^2 = 10, \sum(y - \bar{y})^2 = 26, \sum(x - \bar{x})(y - \bar{y}) = 13$  then calculate coefficient of correlation. 4
- 9.(a) Discuss association between two attributes using 5 % level of significance. 4
- | Attributes | $B_1$ | $B_2$ |
|------------|-------|-------|
| $A_1$      | 46    | 80    |
| $A_2$      | 54    | 120   |
- (b) Fit a straight line  $\hat{y} = a + bx$  for the following data and estimate the value for year 2012: 4
- | Years  | 2007 | 2008 | 2009 | 2010 | 2011 |
|--------|------|------|------|------|------|
| Values | 20   | 25   | 18   | 40   | 32   |

## STATISTICS PAPER-II (NEW SCHEME)

TIME ALLOWED: 20 Minutes

**OBJECTIVE**

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. Attempt as many questions as given in objective type question paper and leave others blank. No credit will be awarded in case BUBBLES are not filled. Do not solve questions on this sheet of OBJECTIVE PAPER.

## Q.No.1

- (1) The whole area under the normal curve is:  
 (A) Zero (B) 0.50 (C) One (D) 0.75
- (2) In normal distribution if  $\mu = 20$  and  $\sigma^2 = 36$  then median is equal to:  
 (A) 20 (B) 36 (C) 6 (D) 40
- (3) The variance of standard normal distribution is:  
 (A) Zero (B) One (C) 100 (D)  $\infty$
- (4) If  $E(\bar{X}) = 12$ , then the value of population mean is:  
 (A)  $\frac{1}{12}$  (B) 24 (C) 12 (D) 144
- (5) The possible samples in sampling with replacement are taken by:  
 (A)  $N^n$  (B)  $n^N$  (C)  ${}^N C_{n-1}$  (D)  ${}^N P_n$
- (6) Sampling error can be reduced by:  
 (A) Non sampling error  
 (B) Increasing the sample size (C) Decreasing the sample size (D) Increasing the population
- (7) Level of confidence is denoted by:  
 (A)  $1 - \alpha$  (B)  $\alpha$  (C)  $1 - \beta$  (D)  $\beta$
- (8) t-distribution has \_\_\_\_\_ degree of freedom.  
 (A)  $n$  (B)  $n - 2$  (C)  $n - 3$  (D)  $n - 1$
- (9) If  $H_0$  is true and we reject  $H_0$ , it is called:  
 (A) Sampling error (B) Standard error (C) Type-II error (D) Type-I error
- (10) If one regression co-efficient is -ve then the other regression co-efficient will be:  
 (A) +ve (B) -ve (C) 0 (D) 1
- (11) The regression equation always passes through:  
 (A)  $(X, Y)$  (B)  $(a, b)$  (C)  $(\bar{X}, \bar{Y})$  (D)  $(0, 0)$
- (12) If  $b_{yx} = r_{xy}$ , then which one is true?  
 (A)  $b_{xy} = b_{yx}$  (B)  $b_{xy} = r_{yx}$  (C)  $b_{xy} = r_{xy}$  (D) All of these
- (13) The attributes  $A$  and  $B$  are called independent when:  
 (A)  $Q = 0$  (B)  $r = 0$  (C)  $Q = 1$  (D)  $r = 1$
- (14) Spearman's co-efficient of rank correlation always lies between:  
 (A) 0 and 1 (B) -1 and +1 (C)  $-\infty$  and  $+\infty$  (D) 0 and  $+\infty$
- (15) For a least squares linear trend  $\hat{Y} = a + bX$ , the  $b$  is the:  
 (A) Variable (B) Intercept (C) Slope (D) Trend value
- (16) Damage to the crops due to flood is:  
 (A) Secular trend (B) Seasonal variation (C) Irregular movement (D) Cyclical variation
- (17) One byte is equal to:  
 (A) 8 bits (B) 4 bits (C) 6 bits (D) 12 bits

**INTERMEDIATE PART-II (12<sup>th</sup> CLASS)****STATISTICS PAPER-II (OLD SCHEME)**

TIME ALLOWED: 3.10 Hours

**SUBJECTIVE**

MAXIMUM MARKS: 83

**NOTE: - Write same question number and its part number in answer book, as given in the question paper.**

**SECTION-I**

2. **Attempt any eight parts.** **8 × 2 = 16**
- What is the shape of Normal distribution?
  - If  $X \sim N(15, 4)$ . Find the value of  $Z$  if  $X = 18$
  - Write down the equation of normal distribution.
  - What is the relation between mean, median and mode of normal distribution?
  - If  $X \sim N(25, 25)$ . Find mean deviation.
  - What is estimator?
  - What are the properties of good estimator?
  - Define test-statistic.
  - What is meant by level of confidence?
  - Define Power of test.
  - Write any two names of input devices.
  - What is ROM?
3. **Attempt any eight parts.** **8 × 2 = 16**
- What are two basic purposes of sampling?
  - Define sampling with and without replacement.
  - Define the term sampling design.
  - Define sampling error. How it can be reduced?
  - What is meant by a sampling distribution and standard error?
  - Given  $\sigma = 6$ ,  $n = 30$  find  $\sigma_{\bar{X}}$
  - Write down the two properties of Least square regression line.
  - Write down the two properties of correlation co-efficient.
  - Given  $r_{xy} = 0.80$ ,  $S_x = 4$ ,  $S_{xy} = 20$  find  $S_y$
  - Define the term correlation co-efficient.
  - What is the relationship between correlation co-efficient and regression co-efficients?
  - Given  $\sum x = 0$ ,  $\sum y = 41172$ ,  $n = 10$ . Find value of "a"
4. **Attempt any six parts.** **6 × 2 = 12**
- What is meant by negative association?
  - Differentiate between class and class frequency.
  - Write down the formula for measuring the degree of rank correlation.
  - Write down two examples of irregular variations.
  - Write down the methods for the estimation of secular trend.
  - What is meant by Seasonal variations?
  - Define the term "Time Series".
  - Define the term "Historigram".
  - Define the term "Signal".

**SECTION-II**

**NOTE: - Attempt any three questions.** **3 × 8 = 24**

- 5.(a) In a normal distribution  $\mu = 40$  and  $P(25 < x < 55) = 0.8662$ . Find  $P(20 < x < 40)$  4
- (b) In a certain examination, the percentage of passes and distinctions were 80 and 10 respectively. Estimate the average marks obtained by the candidates, the minimum pass and distinction marks being 40 and 75 respectively, assume the distribution of marks to be normal. 4
- 6.(a) If Mean of a population is 5 and variance is 2.15. What would be the standard error of mean if  $n = 4$ ? 4
- (b) Take all possible samples of size 2 with replacement from a population 2, 5 and 8. Form sampling distribution of  $\bar{X}$  and find its mean and variance. 4

**P.T.O**

**INTERMEDIATE PART-II (12<sup>th</sup> CLASS)****STATISTICS PAPER-II (OLD SCHEME)**

TIME ALLOWED: 3.10 Hours

**SUBJECTIVE**

MAXIMUM MARKS: 83

**NOTE: - Write same question number and its part number in answer book, as given in the question paper.**

**SECTION-I**

2. **Attempt any eight parts.** **8 × 2 = 16**
- What is the shape of Normal distribution?
  - If  $X \sim N(15, 4)$ . Find the value of  $Z$  if  $X = 18$
  - Write down the equation of normal distribution.
  - What is the relation between mean, median and mode of normal distribution?
  - If  $X \sim N(25, 25)$ . Find mean deviation.
  - What is estimator?
  - What are the properties of good estimator?
  - Define test-statistic.
  - What is meant by level of confidence?
  - Define Power of test.
  - Write any two names of input devices.
  - What is ROM?
3. **Attempt any eight parts.** **8 × 2 = 16**
- What are two basic purposes of sampling?
  - Define sampling with and without replacement.
  - Define the term sampling design.
  - Define sampling error. How it can be reduced?
  - What is meant by a sampling distribution and standard error?
  - Given  $\sigma = 6$ ,  $n = 30$  find  $\sigma_{\bar{X}}$
  - Write down the two properties of Least square regression line.
  - Write down the two properties of correlation co-efficient.
  - Given  $r_{xy} = 0.80$ ,  $S_x = 4$ ,  $S_{xy} = 20$  find  $S_y$
  - Define the term correlation co-efficient.
  - What is the relationship between correlation co-efficient and regression co-efficients?
  - Given  $\sum x = 0$ ,  $\sum y = 41172$ ,  $n = 10$ . Find value of "a"
4. **Attempt any six parts.** **6 × 2 = 12**
- What is meant by negative association?
  - Differentiate between class and class frequency.
  - Write down the formula for measuring the degree of rank correlation.
  - Write down two examples of irregular variations.
  - Write down the methods for the estimation of secular trend.
  - What is meant by Seasonal variations?
  - Define the term "Time Series".
  - Define the term "Historigram".
  - Define the term "Signal".

**SECTION-II**

**NOTE: - Attempt any three questions.** **3 × 8 = 24**

- 5.(a) In a normal distribution  $\mu = 40$  and  $P(25 < x < 55) = 0.8662$ . Find  $P(20 < x < 40)$  4
- (b) In a certain examination, the percentage of passes and distinctions were 80 and 10 respectively. Estimate the average marks obtained by the candidates, the minimum pass and distinction marks being 40 and 75 respectively, assume the distribution of marks to be normal. 4
- 6.(a) If Mean of a population is 5 and variance is 2.15. What would be the standard error of mean if  $n = 4$ ? 4
- (b) Take all possible samples of size 2 with replacement from a population 2, 5 and 8. Form sampling distribution of  $\bar{X}$  and find its mean and variance. 4

**P.T.O**

- 7.(a) The hourly wages of 144 workers of a large factory were recorded and the sample mean and standard deviation were found to be Rs.23.52 and Rs.6.71 respectively. Find a 99 % confidence interval for the mean wages of factory workers. 4
- (b) Let  $X \sim N(\mu, 100)$  and  $\bar{X}$  be the mean of a random sample of 64 observations of  $X$ . If  $\bar{X} = 15$ , test  $H_0: \mu = 12$  against the alternative  $H_1: \mu > 12$ . Use  $\alpha = 0.05$  4
- 8.(a) Given 4
- |     |   |   |    |    |    |
|-----|---|---|----|----|----|
| $X$ | 1 | 2 | 3  | 4  | 5  |
| $Y$ | 8 | 9 | 13 | 18 | 27 |
- Fit the line  $Y = a + bX$  by least squares method and estimate  $Y$  for  $X = 6$
- (b) Compute the correlation coefficient between  $X$  and  $Y$  for the data given in part (a). 4
- 9.(a) The following were "performance under stress" rankings of 10 honor students before and after mid semester: 4
- |             |   |   |   |   |   |   |    |   |   |    |
|-------------|---|---|---|---|---|---|----|---|---|----|
| Students    | A | B | C | D | E | F | G  | H | I | J  |
| Rank before | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| Rank after  | 6 | 5 | 8 | 9 | 3 | 4 | 10 | 1 | 7 | 2  |
- Compute and interpret the rank correlation co-efficient for the data set.
- (b) Fit a trend line to the following informations for the years 1986 to 1992 (both inclusive) 4
- $\sum X = 0$ ,  $\sum Y = 245$ ,  $\sum X^2 = 28$ ,  $\sum XY = 66$

### SECTION-III (PRACTICAL)

10. **NOTE: - Attempt any three parts.** 3 × 5 = 15
- (a) A population consists of  $N = 4$  numbers 1, 3, 4 and 5. Find proportion  $P$  of odd number in all possible samples of size  $n = 3$  that can be drawn without replacement from this population. Assuming the 24 possible samples equally, construct the sampling distribution of sample proportions and find the mean and variance of this distribution.
- Verify: (i)  $\mu_P = \pi$  (ii)  $\sigma_P^2 = \frac{\pi(1-\pi)}{n} \left( \frac{N-n}{N-1} \right)$
- (b) Given the following information find 95 % confidence interval for  $\mu$  in each case:
- (i)  $n_1 = 250$ ,  $\bar{X}_1 = 840$ ,  $S_1^2 = 483$
- (ii)  $n_2 = 200$ ,  $\bar{X}_2 = 686$ ,  $S_2^2 = 410$
- (c) Estimate the regression line of  $Y$  on  $X$  for the following data:
- |     |    |    |    |    |    |    |
|-----|----|----|----|----|----|----|
| $X$ | 25 | 30 | 35 | 40 | 45 | 50 |
| $Y$ | 78 | 70 | 65 | 58 | 48 | 42 |
- An estimate for the value of  $X$  when  $Y = 54$
- (d) The following table shows liking of three colours: Pink, White and Blue in samples of male and females:
- |        |      |        |
|--------|------|--------|
| Colour | Sex  |        |
|        | Male | Female |
| Pink   | 20   | 40     |
| White  | 40   | 20     |
| Blue   | 60   | 20     |
- Test whether there is any relation between sex and colour?
- (e) Calculate 7- days moving average for the following record of attendances:
- |      |        |        |         |           |          |        |          |
|------|--------|--------|---------|-----------|----------|--------|----------|
| Week | Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
| 1    | 24     | 50     | 30      | 48        | 54       | 55     | 62       |
| 2    | 28     | 52     | 41      | 42        | 50       | 41     | 42       |

## STATISTICS PAPER-II (OLD SCHEME)

TIME ALLOWED: 20 Minutes

**OBJECTIVE**

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. Attempt as many questions as given in objective type question paper and leave others blank. No credit will be awarded in case BUBBLES are not filled. Do not solve questions on this sheet of OBJECTIVE PAPER.

Q.No.1

- (1) The number of parameters of Normal distribution is:
  - (A) Four
  - (B) Three
  - (C) Two
  - (D) One
- (2) In Normal distribution if  $\mu = 10$  then mode is:
  - (A) 100
  - (B) 10
  - (C) 5
  - (D) Zero
- (3) Total area under the normal curve is:
  - (A) 1
  - (B)  $< 1$
  - (C)  $> 1$
  - (D) None
- (4) Population parameters are denoted by:
  - (A) Roman letters
  - (B) Greek letters
  - (C) Latin letters
  - (D) English letters
- (5) The mean of sampling distribution of means is denoted by:
  - (A)  $\bar{X}$
  - (B)  $P$
  - (C)  $S^2$
  - (D)  $\mu_{\bar{X}}$
- (6) In sampling without replacement, a sampling unit can be selected:
  - (A) Twice
  - (B) Once
  - (C)  $< 1$
  - (D)  $> 1$
- (7) The point estimator of  $\mu$  is:
  - (A)  $\hat{X}$
  - (B)  $X$
  - (C)  $\bar{X}$
  - (D)  $\bar{X}$
- (8) The probability of type I error is:
  - (A)  $\alpha$
  - (B)  $\beta$
  - (C)  $1 - \alpha$
  - (D) None of these
- (9) Critical region is a region of:
  - (A) Rejection
  - (B) Acceptance
  - (C) Indecision
  - (D) None
- (10) The term regression was used by:
  - (A) Newton
  - (B) Fisher
  - (C) Galton
  - (D) Pearson
- (11) A perfect Negative correlation is represented by:
  - (A) 1
  - (B) Zero
  - (C) Zero and one
  - (D)  $-1$
- (12) If  $r_{xy} = 0.8$  than  $r_{yx}$  is:
  - (A) 0.8
  - (B) 0.6
  - (C) 0.4
  - (D) 0.1
- (13) For  $3 \times 4$  contingency table, the degree of freedom will be:
  - (A) 12
  - (B) 6
  - (C) 4
  - (D) 3
- (14) The eye colour of 100 men is:
  - (A) Attribute
  - (B) Variable
  - (C) All of these
  - (D) None of these
- (15) Fire in a factory is an example of:
  - (A) Secular trend
  - (B) Seasonal variation
  - (C) Cyclical variation
  - (D) Irregular variation
- (16) In semi average method, we divide the data into:
  - (A) 4 parts
  - (B) 2 parts
  - (C) 8 parts
  - (D) None
- (17) The most common input devices are:
  - (A) Monitor and printer
  - (B) Mouse and monitor
  - (C) Keyboard and mouse
  - (D) None of these

**BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, MULTAN**  
**OBJECTIVE KEY FOR INTERMEDIATE ANNUAL EXAMINATION, 2019**

Name of Subject: STATISTICS

Session: STATISTICS

Group: 1st NEW scheme

Group: 2nd Old scheme

Q. Nos	Paper Code 4181	Paper Code 4183	Paper Code 4185	Paper Code 4187
1	C	A	D	B
2	A	B	A	C
3	B	A	B	C
4	C	D	C	A
5	A	D	C	C
6	B	B	A	A
7	A	C	C	B
8	D	D	A	C
9	D	A	B	A
10	B	B	C	B
11	C	C	A	A
12	D	C	B	D
13	A	A	A	D
14	B	C	D	B
15	C	A	D	C
16	C	B	B	D
17	A	C	C	A
18				
19				
20				

Q. Nos	Paper Code 8181	Paper Code	Paper Code	Paper Code
1	C			
2	B			
3	A			
4	B			
5	D			
6	B			
7	D			
8	A			
9	A			
10	C			
11	D			
12	A			
13	B			
14	A			
15	D			
16	B			
17	C			
18				
19				
20				

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