

INTERMEDIATE PART-II (12th 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) Define a Normal Distribution.
- (ii) Enlist four properties of normal distribution.
- (iii) The value of variance in normal distribution is 16. Find the values of μ_2 and μ_4 .
- (iv) In a standard normal distribution find mode and Quartile Deviation.
- (v) In a normal distribution the mean is zero and variance is one. Write down its equation and find the value of maximum ordinate.
- (vi) Differentiate between Estimator and Estimate.
- (vii) Define Unbiasedness.
- (viii) Differentiate the terms level of significance and level of confidence.
- (ix) Explain the terms simple and composite hypothesis.
- (x) Define the term test of hypothesis.
- (xi) Write down the main categories of computers.
- (xii) What is Central Processing Unit?

3. Attempt any eight parts.**8 × 2 = 16**

- (i) What are Random Digits?
- (ii) What are the purposes of Sampling?
- (iii) Define Sampling Unit.
- (iv) What is Statistic?
- (v) Given $N = 310$, $n = 100$, $\sigma^2 = 3500$, sampling is done without replacement, then find $\sigma_{\bar{x}}$.
- (vi) Define Simple Random Sampling.
- (vii) Define Regression.
- (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) Define Correlation.
- (xi) State any two properties of Correlation Coefficient.
- (xii) If $b_{yx} = -0.49$ and $b_{xy} = -1.07$ then find " r ".

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

- (i) What is an Attribute?
- (ii) Define Negative Association.
- (iii) When two attributes are said to be independent?
- (iv) Given $n = 100$, $(A) = 40$, find (α) .
- (v) Given $(A) = 364$, $(B) = 1024$, $(AB) = 256$ and $n = 1216$. Show that attributes A and B are not independent.
- (vi) What is meant by Analysis of Time Series?
- (vii) What are the different components of a time series?
- (viii) Define Irregular fluctuations.
- (ix) Write down Additive Model of Time Series.

P.T.O

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

- 5.(a) In a normal distribution 25 % of items are under 50 and 10 % are over 100. Find mean and standard deviation of the distribution. 4
- (b) If $X \sim N(60, 100)$, find (i) a point that has 15 % area below it
(ii) a point that has 28 % area above it 4
- 6.(a) Draw all possible samples of size 2 with replacement from a population 2, 4 and 6. Show that $\sigma_{\bar{x}}^2 = \sigma^2/2$ 4
- (b) If the size of simple random sample is 49 and variance of sample means is 27. What must be the standard error of sample mean if $n = 169$. 4
- 7.(a) Obtained the best unbiased estimates of the population mean (μ) and variance (σ^2) from which the following sample is drawn $n = 8$; $\sum X = 120$; $\sum(X - \bar{X})^2 = 302$ 4
- (b) Test the null hypothesis $\mu \geq 140$, the mean weight of a sample of 36 people is 146 Lb. Using $\sigma = 15$ Lb $\alpha = 0.05$ 4
- 8.(a) Given that $n = 5$, $\sum X = 15$, $\sum Y = 25$, $\sum(X - \bar{X})(Y - \bar{Y}) = 13$, $\sum(X - \bar{X})^2 = 10$, $\sum(Y - \bar{Y})^2 = 26$. Find regression equation of X and Y . 4
- (b) For a set of 8 pairs of observation we have $\bar{X} = 18$, $\bar{Y} = 20$, $S_x = S_y = 5$ and $\sum(X - \bar{X})(Y - \bar{Y}) = 180$. Find the value of correlation coefficient. 4
- 9.(a) Find whether the data given below in each case are consistent:- 4
(i) $n = 120$, $(A) = 82$, $(AB) = 90$ (ii) $n = 1000$, $(AB) = 200$, $(A\beta) = 350$, $(\alpha B) = 500$
- (b) The parabolic trend equation for the projects of a company is $\hat{y} = 10.4 + 0.6x + 0.7x^2$, with origin at 1980 and unit of measurement for x is one year. Shift the origin to 1975. 4

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) In a normal distribution, $P(-\infty < x < +\infty)$ is equal to:-
 (A) 1 (B) 0 (C) -1 (D) -2
- (2) In a normal distribution, M.D(x) is equal to:-
 (A) $.8989\sigma$ (B) $.7979\sigma$ (C) $.6969\sigma$ (D) $.5959\sigma$
- (3) In a normal distribution if mean = 50, then the value of Median is:-
 (A) 50 (B) 40 (C) 30 (D) 60
- (4) A sample is a part of the:-
 (A) Sampling (B) Population (C) Unit (D) None of these
- (5) Any value calculated from sample data is called:-
 (A) Error (B) μ (C) Statistic (D) Bias
- (6) The complete list of all the sampling units are called:-
 (A) Sampling frame (B) Sample design (C) Sampled population (D) Target population
- (7) A point estimation is used to estimate the unknown true value of population:-
 (A) Data (B) Parameter (C) Estimation (D) Estimate
- (8) The probability of type - II error is denoted by:-
 (A) α (B) β (C) $1 - \beta$ (D) $1 - \alpha$
- (9) If $n < 30$ and σ unknown we use:-
 (A) F - test (B) Z - test (C) t - test (D) Chi - square test
- (10) The dependence of one variable upon other is called:-
 (A) Regression (B) Correlation (C) Covariance (D) None of these
- (11) In regression equation $\hat{y} = a + bx$, $\sum(y - \hat{y}) =$ _____
 (A) -1 (B) 0 (C) 1 (D) 2
- (12) The value of correlation coefficient r lies between:-
 (A) -1 and 0 (B) -1 and +1 (C) 0 and +1 (D) -2 and +2
- (13) The two attributes are independent if:-
 (A) $Q = -1$ (B) $Q = 1$ (C) $Q = 2$ (D) $Q = 0$
- (14) Qualitative variable is also called:-
 (A) Frequency (B) Attribute (C) Class (D) None of these
- (15) Systematic component of variation in a time series is called:-
 (A) Component (B) Noise (C) Signal (D) Series
- (16) Fire in a factory is an example of:-
 (A) Secular trend (B) Cyclical variation (C) Seasonal variation (D) Irregular variation
- (17) The number of instructions processed in one second is called:-
 (A) Data (B) Storage (C) Accuracy (D) Speed

INTERMEDIATE PART-II (12th 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**
- Find the standard deviation, if $Q.D = 2.975$ for a normal distribution.
 - In a normal distribution $\mu = 9$, $Q_3 = 171$, find S.D.
 - Write down the points of inflexion in a normal distribution.
 - In a normal distribution, $Q_1 = 8$ and $Q_3 = 17$, find mean and Q_2 .
 - Define an unbiased estimator.
 - Define Interval estimation.
 - If $\bar{x} = 10$ and $p = 0.3$, then find point estimator of π and μ .
 - What is Alternative Hypothesis?
 - Explain the term Type I – error.
 - What is meant by level of significance?
 - Define Low Level Language.
 - Write two names of input devices of computer.
3. **Attempt any eight parts.** **8 × 2 = 16**
- What is the difference between Population and Sample?
 - Differentiate between Parameter and Statistic.
 - What is Sampling Error?
 - What is Non-sampling error?
 - Define Sampling Frame.
 - Define Random Sampling.
 - Define Correlation.
 - Given $\bar{y} = 1.87$, $b = 0.25$, $\bar{x} = 12.45$ find 'a'.
 - Given $b_{xy} = 0.82$, $r_{xy} = 0.97$, find b_{yx} .
 - Define Positive Correlation.
 - Given $\hat{y} = 45 - 10x$, find \hat{y} when $x = 4$.
 - Given $r_{xy} = 0.8$, $s_x = 4$, $s_{xy} = 20$. Find S_y .
4. **Attempt any six parts.** **6 × 2 = 12**
- When two attributes are said to be negatively associated?
 - Define a contingency Table.
 - Given $(AB) = 150$, $(\alpha B) = 106$, $(A\beta) = 272$, $(\alpha\beta) = 1132$ and $n = 1660$. Find coefficient of association.
 - Define a Time Series.
 - What is meant by Business Cycle?
 - Define Noise.
 - Give two examples of Secular Trend.
 - Define Additive model of time series.
 - What are the merits of Free Hand Curve Method?

SECTION-II

- NOTE: - Attempt any three questions.** **3 × 8 = 24**
- 5.(a) If x is normally distributed with mean = 25 and variance = 16 then find the probability.
- $P(18 \leq x \leq 32)$ (ii) $P(x \geq 30)$ 4
- (b) In a normal distribution, the lower and upper quartiles are respectively 8 and 17. Find the Mean and Standard Deviation. 4
- 6.(a) Take all possible samples of size 3 without replacement from the population 2, 6, 8, 12 and 14. Form sampling distribution of means and find its mean and variance.
- Verify that (i) $\mu_{\bar{x}} = \mu$ (ii) $\sigma_{\bar{x}}^2 = \frac{\sigma^2}{n} \left(\frac{N-n}{N-1} \right)$ 4
- (b) Draw all possible samples of two letters each, with replacement from the letters of the word "NEW" (i) Find proportion of letter "E" in each sample (ii) Make sampling distribution of proportions obtained in part(i) above and find its mean and variance
- (iii) Verify that: (i) $\mu_{\hat{p}} = P$ (ii) $\sigma_{\hat{p}}^2 = \frac{pq}{n}$ 4

P.T.O

- 7.(a) Let two independent random samples each of size 100, from independent normal distributions $N(\mu_1, \sigma_1^2)$ and $N(\mu_2, \sigma_2^2)$ yield $\bar{x}_1 = 4.8$, $\hat{S}_1^2 = 8.64$, $\bar{x}_2 = 5.6$, $\hat{S}_2^2 = 7$.
Find a 95% confidence interval for $\mu_2 - \mu_1$. 4
- (b) A random sample of 10 from a population gave $\bar{X} = 20$ and sum of squares of deviation from mean is 144. Test $H_0: \mu = 19.5$ against $H_1: \mu > 19.5$ at $\alpha = 0.05$ 4
- 8.(a) Fit a regression line of Y on X using the following data:- 4
- | | | | | | |
|---|---|----|----|---|----|
| X | 3 | 4 | 5 | 6 | 7 |
| Y | 7 | 10 | 11 | 8 | 10 |
- (b) Given $\sum xy = 350$, $n = 10$, $\bar{x} = 5$, $\bar{y} = 6$, $S_x^2 = 4$, $S_y^2 = 9$
compute the coefficient of correlation (r_{xy}). 4
- 9.(a) There are 240 A's and 270 B's in 600 observations. What would be the number of AB if A and B are independent? 4
- (b) The following table shows the number of road accidents in Punjab, years 2000 to 2006. 4
- | | | | | | | | |
|--------|------|------|------|------|------|------|------|
| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
| Values | 24 | 20 | 30 | 37 | 40 | 40 | 48 |
- Find trend values \hat{y} by the semi-average method.

SECTION-III (PRACTICAL)

10. **NOTE: - Attempt any three parts.** 3 × 5 = 15
- (a) A family have 5 children, the sex of child is given below:-
- | | | | | | |
|-------|-----|------|------|-----|-----|
| Child | 1 | 2 | 3 | 4 | 5 |
| Sex | Boy | Girl | Girl | Boy | Boy |
- Select all possible sample of size 3 without replacement, make the sampling distribution of proportion of "boy" in the sample and verify that $\mu_{\hat{p}} = p$ and $\sigma_{\hat{p}} = \sqrt{\frac{pq}{n} \cdot \frac{N-n}{N-1}}$
- (b) Given that $\bar{x}_1 = 75$, $n_1 = 9$, $\sum (x_1 - \bar{x}_1)^2 = 1482$, $\bar{x}_2 = 60$, $n_2 = 16$, $\sum (x_2 - \bar{x}_2)^2 = 1830$
Find 90 % confidence interval for $\mu_1 - \mu_2$.
- (c) Fit a 2nd-degree parabola to the following data, taking the year as independent variable:-
- | | | | | | | | |
|--------|------|------|------|------|------|------|------|
| Year | 1990 | 1993 | 1996 | 1999 | 2002 | 2005 | 2008 |
| Values | 87 | 42 | 33 | 29 | 36 | 69 | 79 |
- (d) The following table shows the marks of six students in two subjects:-
- | | | | | | | |
|------|----|----|----|----|----|----|
| Math | 38 | 62 | 56 | 42 | 59 | 48 |
| Stat | 64 | 89 | 84 | 60 | 73 | 69 |
- Calculate coefficient of rank correlation.
- (e) The following table shows the dependence of C.P.U's capacities on the region of internet provisions:-
- | | | | | |
|---------|------------|-----|-----|-----------|
| | Capacities | | | |
| Regions | Below 300 | 450 | 500 | Above 500 |
| Urban | 76 | 78 | 44 | 38 |
| Rural | 24 | 30 | 28 | 42 |
- Test the hypothesis of no dependence at 5 % level of significance.

STATISTICS PAPER-II (OLD SCHEME)

TIME ALLOWED: 20 Minutes

OBJECTIVE

MAXIMUM MARKS: 17

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Q.No.1

- (1) $X \sim N(50, 49)$, if $Y = X - 7$, then standard deviation of Y is:-
 (A) 7 (B) 14 (C) 0 (D) 49
- (2) The mean and standard deviation of the standard normal distribution are respectively:-
 (A) 1 and 0 (B) 0 and 1 (C) μ and σ^2 (D) None
- (3) In a normal curve $\mu \pm \sigma$ covers:-
 (A) 50 % area (B) 68.27 % area (C) 95.45 % area (D) 99.73 % area
- (4) A value calculated from population data is called:-
 (A) Statistic (B) Parameter (C) Standard error (D) None
- (5) Standard error of mean is the standard deviation of:-
 (A) Sample (B) Population (C) Sampling distribution of mean (D) None
- (6) A border patrol check point that stops every passenger van is:-
 (A) Simple random sampling (B) Systematic sampling (C) Complete enumeration (D) None
- (7) Level of significance is denoted by:-
 (A) β (B) $(1 - \beta)$ (C) α (D) $(1 - \alpha)$
- (8) A hypothesis that does not specifies all values of the parameters is called:-
 (A) Simple hypothesis (B) Composite hypothesis (C) Statistical hypothesis (D) None
- (9) A rule or formula that provides a basis for testing a null hypothesis is called:-
 (A) Population statistic (B) Test statistic (C) Level of significance (D) None
- (10) In the regression equation $\hat{y} = a + bx$, y is called:-
 (A) Independent variable (B) Dependent variable (C) Y -intercept (D) None
- (11) b_{yx} and b_{xy} always have:-
 (A) Same signs (B) Opposite signs (C) No signs (D) None
- (12) In the regression equation $\hat{x} = c + dy$, c is called:-
 (A) Y -intercept (B) X -intercept (C) Independent variable (D) Dependent variable
- (13) If $(AB) < \frac{(A)(B)}{n}$, the association between two attributes A and B is:-
 (A) Negative (B) Positive (C) Zero (D) None
- (14) The coefficient of association lies between:-
 (A) 0 to 1 (B) $-\infty$ to ∞ (C) -1 to $+1$ (D) -1 to 0
- (15) The graph of time series is called:-
 (A) Historigram (B) Histogram (C) Ogive (D) Pie diagram
- (16) Increase in the number of patients in a hospital due to heat stroke is:-
 (A) Secular trend (B) Seasonal variation (C) Cyclical variation (D) Irregular variation
- (17) One byte equals:-
 (A) 8 bits (B) 4 bits (C) 6 bits (D) 12 bits

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, MULTAN
OBJECTIVE KEY FOR INTERMEDIATE ANNUAL/SUPPLY EXAMINATION, 2018

Name of Subject: STATISTICS (II) Session: STATISTICS - II
 Group: 1st (New Scheme) Group: 2nd (Old Scheme)

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

Q. Nos	Paper Code 8181	Paper Code 8183	Paper Code 8185	Paper Code 8187
1	A	A	C	B
2	B	C	B	C
3	B	A	B	C
4	B	B	B	C
5	C	A	A	B
6	C	A	B	B
7	C	B	A	B
8	B	B	C	A
9	B	B	A	B
10	B	C	B	A
11	A	C	A	C
12	B	C	A	A
13	A	B	B	B
14	C	B	B	A
15	A	B	B	A
16	B	A	C	B
17	A	B	C	B
18				
19				
20				