Paper Code Number: 4183	2024 (1st-A) INTERMEDIATE PART-II (12th Class)	Roll No:
STATISTICS PAPER-II		
TIME ALLOWED: 20 Minutes	OBJECTIVE	MAXIMUM MARKS: 17

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question.

S.#	QUESTIONS	A	B	C	D
1	The regression line always passes through the point:	$(\bar{x}, \bar{y})$	$(\bar{x}, y)$	$(x, \bar{y})$	None of these
2	If $b_{xy} = -0.78$, $b_{yx} = -0.49$ then the correlation coefficient is:	0.618	-0.618	1.618	0
3	Colour of hair is an example of:	Attribute	Variable	Both A and B	None of these
4	Height of a person is an example of:	Attribute	Variable	Constant	None of these
5	In semi-average method, the data is divided into:	Two parts	Three parts	Four parts	Five parts
6	Fire in a factory is an example of:	Secular trend	Seasonal variations	Cyclical variations	Irregular variations
7	Brain of the computer system is called:	C.P.U	Main Memory	Hard Disk	Monitor
8	Standard deviation of Normal distribution is:	μ	β	α	σ
9	Variance of standard normal distribution is:	0.5	0	1	σ^2
10	In normal distribution, first moment ratio i.e β_1 is:	3	-3	10	0
11	A population which consists of unlimited number of elements is called:	Finite population	Infinite population	Both A and B	None of these
12	The difference between Statistic and its relevant parameter is called:	Sampling error	Non-sampling error	Both A and B	Standard error
13	The random digit from 0 to 9 are called:	Triple digit	Single digit	Double digit	Four digit
14	Probability of making type-II error is denoted by:	α	β	$1-\beta$	$\frac{\alpha}{\beta}$
15	Power of test is denoted by:	α	β	$1-\beta$	γ
16	An innocent person is arrested by police is an example of:	Type-I error	Type-II error	Right decision	None of these
17	If correlation coefficient, $r = 0$, then there is said to be:	High correlation	Perfect positive correlation	Perfect negative correlation	No correlation

INTERMEDIATE PART-II (12th Class)	2024 1st-A)	Roll No: .....
STATISTICS PAPER-II		
TIME ALLOWED: 2.40 Hours	SUBJECTIVE	MAXIMUM MARKS: 68

NOTE: Write same question number and its parts number on answer book, as given in the question paper.

SECTION-I

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

(i) What is the role of the standard deviation in the normal curve?

(ii) Write down any two properties of the normal distribution. (iii) What is the standard normal distribution?

(iv) In a normal distribution $\mu=20$ and $\sigma=4$. What percentage of cases will fall between 16 and 24?

(v) If $X \sim N(100, 100)$ find the value of the maximum ordinate of normal curve.

(vi) Given $n = 40$, $\bar{X} = 32$, $\sigma = 7$ and $Z_{\alpha/2} = 1.96$. Find the confidence interval for 'μ'.

(vii) What is interval estimation? (viii) Define test statistic. (ix) What is meant by critical region?

(x) Given $\Sigma(X_1 - \bar{X}_1)^2 = 26.94$, $\Sigma(X_2 - \bar{X}_2)^2 = 18.73$ and $S_p = 1.81$ then find the degree of freedom $(n_1 + n_2 - 2)$ for t while comparing two population means,

(xi) Differentiate hard and soft copy. (xii) Define Hybrid Computer.

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

(i) Define Population and Sample. (ii) What is Sampling unit?

(iii) Differentiate between sampling with replacement and without replacement. (iv) What is non-sampling error?

(v) If $\mu=50$, $\sigma^2 = 250$ and $n=50$. Find the $\mu_{\bar{x}}$ and $\sigma^2_{\bar{x}}$ if sampling is done with replacement.

(vi) A population consists of 1, 2, 3, 4, 5. Find population proportion for even numbers.

(vii) What is meant by regression? (viii) Define scatter diagram.

(ix) Given $\hat{Y} = 45 - 10X$. Find $\hat{Y}$ when $X = 4$ (x) Write down any two properties of co-efficient of correlation.

(xi) What is perfect positive correlation? (xii) Find b_{yx} if $r = 0.27$ and $b_{xy} = 2.18$

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

(i) Explain Positive Association. (ii) What is meant by attribute?

(iii) Given that $(A) = 400$, $(B) = 200$, $(AB) = 110$, $n = 1000$ then discuss association.

(iv) Define term "Noise" in time series. (v) What is secular trend?

(vi) Write the procedure for calculating trend values by semi-average method.

(vii) Name the components of time series. (viii) Discuss the analysis of time series.

(ix) The estimated straight line is $y = 4 + 0.2x$. Find the trend value if $x = 2, 4$.

SECTION-II

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

5.(a) In a normal distribution, lower and upper quartiles are 8 and 17 respectively. Find μ and σ. 4

(b) Let $X \sim N(20, 25)$, find the area under the normal curve (i) below 30 (ii) between 30 and 42 4

6.(a) A random variable X has the following probability distribution: 4

X:	4	5	6
P(X):	0.3	0.5	0.2

Find (i) Mean and variance of population

(ii) Determine $\mu_{\bar{x}}$ and $\sigma^2_{\bar{x}}$ if a sample of size 2 is taken with replacement.

(b) Take all possible samples of size 2 without replacement from a population consists of 3, 4, 5, 6. Calculate the proportion of odd numbers in each sample and show that $E(P) = \pi$ 4

7.(a) Find 95% confidence interval for mean of normal distribution if $\sigma = 72$ and samples of size 81 gave the mean 50.68. 4

(b) A random sample of size 10 from a population gave $\bar{x} = 20$ and sum of squares of deviations from mean is 144. Test $H_0: \mu = 19$ against $H_1: \mu \neq 19$ use $\alpha = 0.05$ 4

8.(a) Find correlation coefficient between income(X) and expenditure(Y). 4

X	1	2	3	4	5
Y	2	4	7	9	10

Comment your answer. 4

(b) Fit a regression line of Yield(Y) on Fertilizer(X) that is $\hat{Y} = a + bX$

X	1	2	3	4
Y	9	15	20	26

Estimate Y when $X = 5$

9.(a) Find Y^2 and test the association between injection against typhoid and exemption from attack for the following data. Use $\alpha = 0.05$ 4

	Attacked	Not-attacked
Inoculated	528	25
Not-inoculated	790	175

(b) Compute 3 – years moving average from the following data: 4

Years	1996	1997	1998	1999	2000
Values	80	74	90	88	95

Paper Code Number: 4181	2023 (1^{st}-A) INTERMEDIATE PART-II (12^{th} Class)	Roll No: _____

STATISTICS PAPER-II

TIME ALLOWED: 20 Minutes	OBJECTIVE	MAXIMUM MARKS: 17

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question.

S.#	QUESTIONS	A	B	C	D
1	In a normal distribution, X lies between:	$-\infty$ and 0	$-\infty$ and $+\infty$	0 and $+\infty$	-1 and $+1$
2	Standard normal random variable is denoted by:	Z	X	Y	ϕ
3	If $X \sim N(100, 25)$, then median is:	25	5	100	0
4	Sample size is denoted by:	N	m	$N(N-1)$	n
5	Any measure of the sample is called:	Parameter	Statistic	Constant	Sampling
6	The random digits from 0 to 9 have probability:	$\frac{1}{10}$	$\frac{2}{10}$	$\frac{4}{10}$	$\frac{1}{100}$
7	The statistical inference can be divided into approaches:	Four	Three	Two	Five
8	Level of confidence is denoted by:	α	β	$1-\beta$	$1-\alpha$
9	P (Rejecting H_0/H_0 is true) is equal to:	$1-\alpha$	α	$1+\alpha$	β
10	Dependent variable is also called:	Predictor	Regressor	Regressand	Fixed
11	The sum of the residuals is:	Zero	One	Two	Three
12	When two variables are uncorrelated the r is:	-1	$+1$	2	0
13	For a contingency table $d.f. = 12$ and $r = 4$, the c is:	4	5	2	3
14	Rank correlation coefficient lies between:	0 and 1	-1 and 0	-1 and $+1$	-2 and 1
15	The graph of time series is called:	Historigram	Bar diagram	Histogram	Curve
16	A rise in prices before eid is an example of:	Secular trend	Seasonal variations	Cyclical variations	Irregular variations
17	The brain of the computer is known as:	ALU	ROM	RAM	CPU

INTERMEDIATE PART-II (12th Class)	2023 (1st-A)	Roll No:
STATISTICS PAPER-II		
TIME ALLOWED: 2.40 Hours	**SUBJECTIVE**	**MAXIMUM MARKS: 68**

NOTE: Write same question number and its parts number on answer book, as given in the question paper.

SECTION-I

2. Attempt any eight parts. Multan Board-2023 **8 × 2 = 16**

(i)	Define normal probability distribution.	(ii)	Express the term standard normal variate.
(iii)	Enlist two properties of normal distribution.	(iv)	In a normal distribution, $\mu = 163$, $Q_3 - 171.094$. Compute standard deviation of the given distribution.
(v)	In a normal distribution, $\mu = 24$, $\sigma = 4$. Calculate fourth moment about mean.	(vi)	Describe the term statistical inference.
(vii)	Define an estimator.	(viii)	Elaborate type – II error.
(ix)	Define level of significance.	(x)	Given $n = 16$, $s = 0.75$, $\bar{X} = 10.5$, $\mu_0 = 10$. Compute the test statistic (t – test).
(xi)	Describe a monitor.	(xii)	What is meant by byte?

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

(i)	Define sample.	(ii)	What is standard error?
(iii)	Define the term bias.	(iv)	What is non-sampling error?
(v)	Given $n = 9$, $\mu_{\bar{X}} = 4$, $\sigma_{\bar{X}} = 2.5$ find μ and σ.	(vi)	If $n = 40$, $\pi = 0.7$ then find μ_P and σ_P.
(vii)	What is meant by regression?	(viii)	Define dependent variable.
(ix)	Define the term correlation.	(x)	Interpret the meaning when $r = -1$.
(xi)	Given that $\bar{x} = 1$, $\bar{y} = 8$, $b = 2$ find y – intercept.	(xii)	If $\hat{y} = 11.8 + 2x$ and $\hat{x} = -5.5 + 0.5y$ then find r.

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

(i)	Define a contingency table.
(ii)	Given $(AB) = 95$, $(A\beta) = 55$, $(\alpha\beta) = 85$ and $(\alpha\beta) = 45$. Find the coefficient of association.
(iii)	Given $f_0 = 7, 8, 15, 20$ and $f_e = 11.88, 12.88, 10.12, 15.12$. Find the value of chi-square.
(iv)	Define a time series.
(v)	Explain the term "Noise" in time series.
(vi)	Explain what is meant by seasonal variations?
(vii)	Given $(Y - \hat{Y}) = 0.5, -0.5, 1, -1, 0.5, -0.5$. Find sum of squares of residuals.
(viii)	Given $\hat{Y} = 10 + 3X$ find the trend values for $X = 1, 2, 3, 4$.
(ix)	What do you mean by Historigram?

SECTION-II

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

5.(a)	If the diameters of ball bearings are normally distributed with mean 0.6140 inches and standard deviation 0.0025 inches. Determine the percentage of ball bearings with diameters. (i) less than 0.608 inches (ii) greater than 0.617 inches
(b)	Scores on a national education achievement test are normally distributed with $\mu = 500$ and $\sigma = 100$ (i) What is the 95th percentile of this distribution? (ii) What are the lower and upper quartiles of this distribution?
6.(a)	Draw all possible samples of size 2 with replacement from the population 3.5, 7 and 9. Verify that (i) $\mu_{\bar{x}} = \mu$ (ii) $\sigma_{\bar{X}} = \frac{1}{\sqrt{2}}\sigma$
(b)	If $N_1 = 400$, $N_2 = 200$, $n_1 = 100$, $n_2 = 110$, $\mu_1 = 500$, $\mu_2 = 800$, $\sigma_1 = 10$, $\sigma_2 = 10$ obtain mean and standard error of sampling distribution of $\bar{X}_1 - \bar{X}_2$. If sampling is done W.O.R.
7.(a)	If $\bar{x} = 100$, $s = 8$ and $n = 64$. Construct a 99% confidence interval for population mean (μ).
(b)	A random sample of 25 values gives the average 83. Can this sample regarded as drawn from the normal population with mean 80 and $\sigma = 7$ with $\alpha = 0.05$
8.(a)	Calculate correlation coefficient and interpret it between marks and study hours.

Marks	10	15	9	21	7
Study Hours	2	3	1	4	1

(b)	Fit a regression line to data given in part(a) to predict marks. Estimate marks when study hours are 5.
9.(a)	Given the following data. Find whether A and B are independent or associated. $n = 150$; $(A) = 30$; $(B) = 60$; $(AB) = 12$
(b)	If the linear trend in the data for the years 1960 to 1965. Both inclusive with origin at the middle of 1962 and 1963 is $\hat{y} = 1306.667 + 73.428x$, the unit of x being one year, then determine the trend line with origin at 1960 and hence determine the trend values.

TIME ALLOWED: 20 Minutes **OBJECTIVE** MAXIMUM MARKS: 17

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Q.No.1

(1) In standard normal distribution, mean is:

(A) 0 (B) 1 (C) 2 (D) 3

(2) Normal distribution is:

(A) Bi-modal (B) Tri-modal (C) Multi-modal (D) Uni-modal

(3) In normal distribution, the area above the third quartile is:

(A) 75% (B) 30% (C) 25% (D) 70%

(4) Complete list of sampling units is called:

(A) Sampling frame (B) Sample design (C) Sampled population (D) Target population

(5) If sampling is done with replacement, then total number of possible samples are:

(A) ${}^{N}C_{n}$ (B) ${}^{N}P_{n}$ (C) n^{N} (D) N^{n}

(6) Probability distribution of any statistic is called:

(A) Sampling distribution (B) Population distribution
(C) Frequency distribution (D) Sample distribution

(7) A specific value calculated from sample is called:

(A) Estimator (B) Estimate (C) Estimation (D) Bias

(8) If $E(\hat{\theta}) = \theta$ then estimator $\hat{\theta}$ is said to be _____ for parameter θ.

(A) Biased (B) Unbiased (C) Consistent (D) Efficient

(9) Rejecting H_0 when H_0 is true is called:

(A) No error (B) Type II error (C) Type I error (D) α

(10) Which of the followings is a simple hypothesis? if $\theta_0 = 15$

(A) $\theta < \theta_0$ (B) $\theta > \theta_0$ (C) $\theta \neq \theta_0$ (D) $\theta = \theta_0$

(11) If $\sum y = 96$ and $n = 8$, if $b = 0$ then value of "a" is:

(A) 10 (B) 11 (C) 12 (D) 13

(12) The independent variable is also called:

(A) Regressor (B) Regressand (C) Predictand (D) Explained

(13) The value of coefficient of correlation lies between:

(A) -1 and 0 (B) -1 and $+1$ (C) 0 and $+1$ (D) -2 and $+1$

(14) The value of χ^2 statistic is always:

(A) Zero (B) Less than zero (C) Unity (D) Positive

(15) The characteristic which varies in quality from one individual to another is called:

(A) Variable (B) Attribute (C) Statistic (D) Parameter

(16) The systematic component of time series which follows regular pattern of variation is called:

(A) Signal (B) Noise (C) Error (D) Model

(17) Decomposition of time series is called:

(A) De-trending (B) Noise (C) Analysis of time series (D) None

TIME ALLOWED: 2.40 Hours **SUBJECIVE** MAXIMUM MARKS: 68

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

SECTION-I

2. **Write short answers to any eight parts.** **8 × 2 = 16**

(i) Define normal probability distribution.

(ii) Write any four properties of normal distribution.

(iii) In a normal distribution, mean is 100 and standard deviation is 10. Find mean deviation.

(iv) What is the relationship between quartile deviation and standard deviation of normal distribution?

(v) Write the equation of normal curve with mean μ and standard deviation 5.

(vi) Find $p(z > 1.5)$

(vii) What is meant by interval estimation?

(viii) Define hypothesis.

(ix) Distinguish between critical region and acceptance region.

(x) Describe one tail test and show it graphically on the answer sheet.

(xi) Given $\mu = 5,\ n = 9,\ \overline{X} = 2,\ Z_c = -2$. Find δ.

(xii) Define type – I error.

3. **Write short answers to any eight parts.** **8 × 2 = 16**

(i) Define Sampling.

(ii) Write any four advantages of sampling.

(iii) Define Standard Error.

(iv) Define Sampling frame.

(v) What is the difference between Parameter and Statistic?

(vi) Write the properties of sampling distribution of sample means.

(vii) Define Dependent variable.

(viii) What is Simple Linear Regression?

(ix) Write any two properties of coefficient of correlation 'r'.

(x) Define Negative correlation.

(xi) Given $r = 0.8,\ S_{XY} = 20,\ S_X = 4$ then find S_Y

(xii) What is regression analysis?

4. **Write short answers to any six parts.** **6 × 2 = 12**

(i) What is meant by independence of attributes?

(ii) What is the relation between two attributes if $Q = +1$?

(iii) Differentiate between class and class frequency.

(iv) Explain the term contingency table.

(v) Differentiate between Historigram and Histogram.

(vi) What are Seasonal Variation?

(vii) Differentiate between Signal and Noise.

(viii) Define method of Semi-Average.

(ix) Write down phases of cyclical variation.

SECTION-II

NOTE: Attempt any three questions. $3 \times 8 = 24$

5.(a) Find area under the normal curve in each of the following cases: 4

(i) Between $Z = -0.46$ and $Z = 2.21$

(ii) Between $Z = 0.81$ and $Z = 1.94$

(b) In a normal distribution mean = 60 and S.D = 10. 4

Find the area (i) more than 75 (ii) between 50 and 70

6.(a) A population contains 1, 3, 5 values. Take all possible samples of size 2 with replacement from this population. Construct a sampling distribution of sample means and sample variances. 4

(b) From a population 9 and 3

(i) Find all possible samples of size 3 with replacement and compute mean of each sample.

(ii) Make the sampling distribution of $\bar{X}$ and find its mean and variance. 4

7.(a) Find a 90% confidence interval for the mean of a normal population with $\sigma = 3$, given the sample as 2.3, –0.2, –0.6, –0.9 4

(b) In a random sample of 1000 houses in a certain city, 618 own color T.V. sets. Is this sufficient evidence to conclude that $\frac{2}{3}$ of the houses in this city have color T.V. sets? Use $\alpha = 0.02$ 4

8.(a) Estimate the regression line Y on X for the following data: 4

X	6	9	12	14
Y	31	27	29	47

(b) For a sample of 8 pairs of observations, we have

$\sum X = 20,\ \sum Y = 260,\ \sum XY = 3490,\ \sum X^2 = 3144,\ \sum Y^2 = 29950$

find the coefficient of correlation 'r'. 4

9.(a) The following table shows the marks of six candidates in two subjects 4

Candidate	A	B	C	D	E	F
Math x_i	38	62	56	42	59	48
Stat y_i	64	89	84	60	73	69

(i) Calculate the coefficient of rank correlation.

(ii) Comment on the value of your result.

(b) Find 4 – Quarter centred moving averages for the following data: 4

Year	Quarter			
	I	II	III	IV
1948	71	72	78	84
1949	72	69	75	79
1950	73	80	85	86

Number: 4181 **INTERMEDIATE PART-II (12th CLASS)** Multan Board-2018

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 $\hat{y} = a + bx$, $\Sigma(y - \hat{y}) =$ _____

(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

2018 (A) Roll No: _____

INTERMEDIATE PART-II (12th CLASS)

STATISTICS PAPER-II (NEW SCHEME)

TIME ALLOWED: 2.40 Hours **SUBJECIVE** 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. $3 \times 8 = 24$

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 $n = 8;\ \Sigma X = 120;\ \Sigma(X - \bar{X})^2 = 302$ 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 $n = 5,\ \Sigma X = 15,\ \Sigma Y = 25,\ \Sigma(X - \bar{X})(Y - \bar{Y}) = 13,$ $\Sigma(X - \bar{X})^2 = 10,\ \Sigma(Y - \bar{Y})^2 = 26$. 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 $\Sigma(X - \bar{X})(Y - \bar{Y}) = 180$. 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