Paper Code Number: 4183·	2024 (1ˢᵗ-A) INTERMEDIATE PART-II (12ᵗʰ Class)		Roll No: *MTN-24*

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	$1 - \beta$	$\dfrac{\alpha}{\beta}$
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

40(Obj)(☆☆)-2024(1ˢᵗ-A)-2500   **(MULTAN)**

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. $8 \times 2 = 16$

(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 $\sum(X_1 - \bar{X}_1)^2 = 26.94$, $\sum(X_2 - \bar{X}_2)^2 = 18.73$ 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. $8 \times 2 = 16$

(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 $\sigma_{\bar{X}}^2$ 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. $6 \times 2 = 12$

(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. $3 \times 8 = 24$

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 $\sigma_{\bar{X}}^2$ 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 χ^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