STATISTICS   PAPER-II   MTN-12-23

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

40(Obj)(★)-2023(1ˢᵗ-A)-2500   **(MULTAN)**

SECTION-I

2. Attempt any eight parts. $\qquad 8 \times 2 = 16$

(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 $n = 16$, $s = 0.75$, $\overline{X} = 10.5$, $\mu_0 = 10$. Compute the test statistic (t – test).
(xi)	Describe a monitor.	(xii)	What is meant by byte?

3. Attempt any eight parts. $\qquad 8 \times 2 = 16$

(i)	Define sample.	(ii)	What is standard error?
(iii)	Define the term bias.	(iv)	What is non-sampling error?
(v)	Given $n = 9$, $\mu_{\overline{X}} = 4$, $\sigma_{\overline{X}} = 2.5$ 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. $\qquad 6 \times 2 = 12$

(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. $\qquad 3 \times 8 = 24$

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) $\sigma_{\bar{X}} = \dfrac{1}{\sqrt{2}}\sigma$
(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 $\overline{X}_1 - \overline{X}_2$. 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.