12161
STATISTICS
PART-II

NOTE: There are three sections of this paper. Carefully read the instructions for each section and attempt accordingly. Attempt all questions of Section-A and return it to the Superintendent within given time, even if you have not attempted any question. Select the correct choice and write only A, B, C or D, whichever is appropriate, in the answer box. No marks will be awarded for cutting/erasing or overwriting.

SECTION-A

Time: 20 Minutes **Marks:** 18

1. Normal distribution is the limiting form of ..... A) t-distribution, B) chi-square distribution, C) binomial distribution, D) sampling distribution ..... [ ]

2. The area under the normal curve is ..... A) 0.5, B) zero, C) $-\infty$ to $+\infty$, D) 1 ..... [ ]

3. $V(\bar{X})$ = ... A) σ/n, B) n/σ, C) σ^2, D) σ^2/n ..... [ ]

4. Consider a population with $\mu=50$ and $\sigma=10$. Use sample of $n=25$ to estimate μ. What is the mean of the sampling distribution $\bar{X}$? A) 2, B) 10, C) 50, D) none of these ..... [ ]

5. In a sampling from a population with $\sigma=20$, the standard error of mean is found to be 2. What was the size of simple random sample? A) 10, B) 40, C) 100, D) none of these ..... [ ]

6. Numerical measures of population data are called ..... A) statistic, B) inference, C) parameters, D) estimation ..... [ ]

7. A 95% confidence interval for the population mean is of the form .....
A) $\bar{X} \pm 1.96\frac{\sigma}{\sqrt{n}}$, B) $\bar{X} \pm 2.58\frac{\sigma}{\sqrt{n}}$, C) $\bar{X} \pm 1.28\frac{\sigma}{\sqrt{n}}$, D) $\bar{X} \pm 1.645\frac{\sigma}{\sqrt{n}}$ ..... [ ]

8. By increasing the sample size, α and β will ..... A) increase, B) decrease, C) remain the same, D) change in opposite direction ..... [ ]

9. $\Sigma(Y-\hat{Y})$ = ... A) $\Sigma(Y-\bar{Y})$, B) zero, C) minimum, D) maximum ..... [ ]

10. Coefficient of correlation is ..... of two regression coefficients. A) A.M, B) H.M, C) G.M, D) median .... [ ]

11. In regression equation $\hat{Y}=a+bX$, "a" is ..... A) slope of line, B) regression coefficient, C) both A&B, D) y-intercept ..... [ ]

12. The measure of association in ordinal data is known as ..... A) goodness of fit, B) rank correlation, C) regression coefficient, D) both A&B ..... [ ]

13. For a 5×6 contingency table, the degrees of freedom for chi-square test are ..... A) 20, B) 30, C) 24, D) 25 ..... [ ]

14. Given the numbers 2, 3, 7, 6, 8, 9, 10, the semi averages are given as ..... A) (4,9), B) (7,8), C) (3,9), D) none of these ..... [ ]

15. There are ..... components of a time-series. A) 6, B) 5, C) 4, D) 3 ..... [ ]

16. Which one is called the brain of computer? A) RAM, B) software, C) storage device, D) processor ..... [ ]

17. The octal number system has base ..... A) 2, B) 8, C) 10, D) 16 ..... [ ]

18. A byte is a string of ..... bits. A) 2, B) 8, C) 10, D) 16 ..... [ ]

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Time: 2 Hours 40 Minutes

SECTION-B

Marks: 40

1. Attempt any ten of the following. All carry equal marks.

   i. Find: (i) $P[-0.64 \leq Z \leq -0.12]$ (ii) $P[Z \geq -3.03]$

   ii. What are advantages of sampling?

   iii. The mean and variance of the first population are 7 and 8/3 and of the second population are 4 and 8/3 respectively. Find mean and variance of the sampling distribution of $(\bar{X}_1 - \bar{X}_2)$.

   iv. Describe the properties of a good point estimator.

   v. Write down 90% C.I for μ when sample size is 20.

   vi. Write down the general procedure for testing of hypothesis about a population proportion.

   vii. Describe simple and composite hypothesis.

   viii. Let regression coefficients of a set of data are 5.5 and 0.17. Find the coefficient of correlation.

   ix. Compute Spearman's rank correlation coefficient if: $n = 9$, $\Sigma(r_i - s_i)^2 = 36$

   x. Describe the different components of time series.

   xi. Use method of least square to fit a straight line when: $n = 6$, $\Sigma X = 0$, $\Sigma Y = 590$, $\Sigma X^2 = 70$, $\Sigma XY = 290$

   xii. What are hardware and software?

   xiii. Convert: $(511)_8 = (?)_{16}$

SECTION-C

Marks: 27

NOTE: Attempt any three of the following questions. All questions carry equal marks.

2. Draw all possible samples of size 3 without replacement from the population 1,3,5,8,10,14. Find the proportion of even numbers and verify that: (i) $\mu_{\hat{p}} = P$ (ii) $\sigma^2_{\hat{p}} = \frac{pq}{n}\left(\frac{N-n}{N-1}\right)$

3. Given the bivariate data:

x:	1	5	3	2	1	1	7	3
y:	6	1	0	0	1	2	1	5

   Find the regression line of y on x and hence predict y, if $x = 10$

4. Competitors in a beauty contest are ranked by two judges in the following order:

First Judge:	3	1	4	2	5	9	8	7	6
Second Judge:	5	3	2	1	4	6	9	7	8

   Calculate Spearman's rank correlation coefficient.

5. Fit a second degree parabola to the following data:

Year:	1993	1994	1995	1996	1997	1998	1999	2000
Production (in tons)	80	90	92	83	94	99	92	110