

CUET Mathematics Test

Chapter: Unit VI: Inferential Statistics

General Instructions

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

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1. A researcher wants to study the average height of all adult males in India. He selects 500 males from five major cities. In this context, the group of all adult males in India is known as:
 - (A) Sample
 - (B) Parameter
 - (C) Population
 - (D) Statistic
2. Which of the following is a numerical characteristic of a sample?
 - (A) Parameter
 - (B) Statistic
 - (C) Census
 - (D) Variable
3. According to the Central Limit Theorem (CLT), regardless of the shape of the population distribution, the sampling distribution of the sample mean becomes approximately normal if:
 - (A) The sample size is small
 - (B) The population variance is unknown
 - (C) The sample size is sufficiently large ($n \geq 30$)
 - (D) The population mean is zero
4. If X is a random variable with mean μ and variance σ^2 , the standard error of the mean for a sample of size n is:
 - (A) σ/n
 - (B) σ/\sqrt{n}
 - (C) σ^2/n
 - (D) $\sqrt{\sigma/n}$
5. The t-distribution is most commonly used when:
 - (A) The population is normal and the sample size is large
 - (B) The sample size is small and population standard deviation is unknown
 - (C) The population is not normal and n is large
 - (D) The population mean is unknown but variance is known
6. For a one-sample t-test with a sample size of 15, the degrees of freedom (df) is:
 - (A) 15
 - (B) 16
 - (C) 14
 - (D) 30
7. In an independent two-sample t-test, the sample sizes are $n_1 = 10$ and $n_2 = 12$. The degrees of freedom for this test is:
 - (A) 22
 - (B) 20
 - (C) 21
 - (D) 11
8. The null hypothesis $H_0 : \mu = \mu_0$ is tested against $H_a : \mu \neq \mu_0$. This is an example of:
 - (A) One-tailed test (Right)
 - (B) One-tailed test (Left)
 - (C) Two-tailed test
 - (D) Non-parametric test

9. A sample of 9 observations has a mean of 50 and a standard deviation of 6. The calculated t-value to test $H_0 : \mu = 46$ is:
- (A) 2.0
 - (B) 1.5
 - (C) 3.0
 - (D) 0.5
10. As the degrees of freedom increase, the t-distribution curve:
- (A) Becomes flatter
 - (B) Becomes more skewed
 - (C) Approaches the standard normal distribution curve
 - (D) Becomes narrower at the tails
11. Which of the following statements about the Central Limit Theorem is FALSE?
- (A) The mean of the sampling distribution equals the population mean
 - (B) The sampling distribution is skewed if the population is skewed, regardless of n
 - (C) The variance of the sampling distribution is σ^2/n
 - (D) It allows us to use normal probability tables for non-normal populations
12. In a t-test, if the calculated $|t|$ value is greater than the table (critical) value at a given significance level, we:
- (A) Accept the null hypothesis
 - (B) Reject the null hypothesis
 - (C) Conclude the data is insufficient
 - (D) Change the significance level
13. Two independent samples of sizes 5 and 7 are drawn from two normal populations. To test the difference between means, the pooled estimate of variance s_p^2 is used if:
- (A) Population variances are assumed equal
 - (B) Population means are equal
 - (C) Samples are dependent
 - (D) One sample is larger than the other
14. The standard deviation of a sampling distribution is specifically called:
- (A) Standard deviation
 - (B) Sampling variance
 - (C) Standard Error
 - (D) Bias
15. A machine fills bags with 500g of sugar. A sample of 25 bags shows a mean of 495g and sample standard deviation of 10g. The t-statistic is:
- (A) -2.5
 - (B) 2.5
 - (C) -5.0
 - (D) 5.0
16. The t-test was developed by William Sealy Gosset, who published under the pseudonym:
- (A) Alpha
 - (B) Student
 - (C) Pearson
 - (D) Fisher
17. If the 95% confidence interval for the mean is (45, 55), then:
- (A) The sample mean is 50

- (B) The population mean is definitely 50
(C) 95% of all population values lie between 45 and 55
(D) The standard error is 10
18. For a two-sample t-test with $n_1 = n_2 = 10$, the pooled degrees of freedom is 18. If the calculated $t = 2.101$ and the critical value $t_{0.05,18} = 2.101$, the result is:
(A) Significant at 5% level
(B) Not significant at 5% level
(C) Significant at 1% level
(D) Inconclusive
19. The assumption of "Homoscedasticity" in a two-sample t-test refers to:
(A) Normality of distributions
(B) Equality of variances
(C) Independence of observations
(D) Randomness of samples
20. A population has $\mu = 100$ and $\sigma = 16$. For a sample size of $n = 64$, the probability that the sample mean is greater than 102 (using CLT) is:
(A) 0.1587
(B) 0.8413
(C) 0.0228
(D) 0.9772

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