Psychology 2101
Final Exam Practice Multiple Choice Items

Student Name: ___________________________________

Instructions: **Answer all questions** by circling the correct answer on the test paper. There is **no penalty for guessing**. If you believe that an item is incorrect, or has more than one correct answer, indicate your reasoning on the test paper with a brief note. This exam is open book, open note, and calculators may be used. Computers may not be used.

1 Incorrectly accepting a false statistical null hypothesis that is true is to commit

(a) a Gamma Error
(b) a Beta Error
(c) a Type I Error
(d) a Type II Error

2 If $\alpha = 0.1$, then the probability of a correct acceptance of a true statistical null hypothesis is

(a) 0.01
(b) 0
(c) it cannot be determined from the information provided
(d) 0.9
(e) β

3 Suppose you have a binomial process based on 10 trials, with probability of success equal to $\frac{1}{2}$. What is the probability of obtaining exactly 5 successes in this situation?

(a) $\frac{1}{4} = 0.25$
(b) $\frac{213}{256} = 0.83203$
(c) $\frac{63}{256} = 0.24609$
(d) None of the above.

4 Suppose you run an opinion poll with $N = 100,$ and the population proportion p is actually 1/2. Which of the following is closest to the probability that you will obtain a result that is within $.10$ of p (i.e., $.4 \le \hat{p} \le .6$)?

(a) 0.81480
(b) 0.86480
(c) 0.96480
(d) 0.90480

5 Other factors remaining constant, which of the following factors would increase power?

(a) Increase β
(b) Increase α
(c) Increase the error variance in the data
(d) Decrease sample size

6 In hypothesis testing, if the computed *t*-statistic exceeds a positive "critical value" of the sampling distribution, one should

(a) reject H_0 as untenable
(b) accept H_0 as tenable
(c) use extreme caution in making statistical conclusions
(d) withhold judgment about H_0 until additional data are available

7 A Type II error has been made when one

(a) accepts H_0 when it is true
(b) rejects H_0 when it is true
(c) rejects H_0 when it is false
(d) accepts H_0 when it is false

8 John performs a significance test and rejects the statistical null hypothesis with $\alpha = .05$. In this case, the probability of a Type II error is

(a) .25
(b) .95
(c) .50
(d) .75
(e) 0

9 The statistical null hypothesis (H_0) can be rejected with absolute certainty if

(a) the statistic exactly coincides with the value of the parameter specified by the null hypothesis

(b) the sample consists of the entire population

(c) all sampling procedures and computations are 100% correct

(d) the data allow H_0 to be rejected at the $.0001$ level

(e) the researcher has a Ph.D. degree

10 When the critical value for the *t*-distribution for any given α level is compared with the critical value from the normal distribution at the same α level, the value of the critical t is

(a) constant, regardless of degrees of freedom

(b) identical

(c) larger

(d) smaller

11 A statistical null hypothesis is a statement concerning

(a) one or more population parameter(s)

(b) sample characteristics

(c) α

(d) confidence intervals

(e) β

12 In general, and with other things remaining constant, if the level of significance (α) is increased from $.01$ to $.10$,

(a) the absolute value of the critical value of the *z*-test will decrease

(b) all of the above are true

(c) the (critical) rejection region of the sampling distribution will increase in area

(d) statistical power will increase

13 The difference between the t distribution and the normal distribution is trivial when

(a) the degrees of freedom are large
(b) H_0 is true
(c) sample sizes for two groups are equal
(d) the degrees of freedom are small
(e) H_0 is false

14 A researcher set $a = .05$, and then carried out 20 statistical tests as part of a large project. By chance alone, about how many statistically significant t-tests would be expected if H_0 is true in all of the 20 situations?

(a) 6
(b) 3
(c) 1
(d) more than 10
(e) 0

15 If the observed t- statistic for a two-sample independent sample t test is approximately 0, one would conclude that

(a) the sample sizes were too small
(b) the measures used have little or no validity
(c) the two populations have equal means
(d) no convincing evidence for a difference has been found

16 Whether a 1-tailed or 2-tailed test is called for depends upon the

(a) tenability of the underlying statistical assumptions for the tests
(b) observed difference in the two sample means
(c) nature of the statistical null and alternative hypotheses
(d) size of the samples
(e) shapes of the distributions from which the samples were drawn

17 The probability of a Type II error in a t-test can be reduced by

(a) all of the above

(b) relaxing α (e.g., from $.01$ to $.05$)

(c) using a “1-tailed” test if it is indeed appropriate

(d) increasing the sample sizes

18 In "Reject-Support" hypothesis testing, the statistical null hypothesis H_0 is

(a) usually the opposite of what the experimenter believes (or is trying to show)

(b) is true if the test statistic is not in the rejection region

(c) always has a probability of rejection of α

(d) is true if the test statistic is in the rejection region

19 Suppose you somehow knew that the population standard deviation σ is 10, and that the population distribution is normal. You wish to test the null hypothesis that $\mu = 0$, using the 1-Sample Z-test of the form

$$Z = \frac{\overline{X}_\bullet}{\sigma/\sqrt{N}}$$

What is the statistical power if $\alpha = .05$, $N = 36$, and the true mean is $\mu = 3.8$?

(a) 0.50042

(b) 0.62553

(c) 0.52553

(d) 0.67307

(e) 0.42553

(f) 0.68808

(g) 0.75064

(h) 0.56298

20 Suppose the standardized effect size E_s is $.175$. If you run your significance test as a two-tailed test with $\alpha = .01$, what is the minimum sample size required to assure a power of at least $.90$?

(a) 486
(b) 215
(c) 509
(d) 503
(e) 542
(f) 344
(g) 972
(h) 472

21 Suppose you are performing a sign test on 14 pairs of observations, and you wish to test the null hypothesis that the two populations have equal means. What should your rejection region be in order to have a symmetric, two-tailed test with α as high as possible without exceeding $.05$?

(a) Reject H_0 if $X \geq 12$ or if $X \leq 2$
(b) Reject H_0 if $X \geq 12$ or if $X \leq 3$
(c) Reject H_0 if $X \geq 11$ or if $X \leq 3$
(d) Reject H_0 if $2 \leq X \leq 12$
(e) Reject H_0 if $X \geq 11$ or if $X \leq 2$

22 Nationwide norms for the Holzinger 8th grade reading test are a mean of 500 and a standard deviation of 100. Suppose you take a random sample of size 100 from the local area and find a sample mean of $\overline{X} = 94.65$. Using the Z-test, with $\alpha = .05$, you test the hypothesis that

$$H_0 : \mu = 100$$

against the alternative

$$H_1 : \mu \neq 100$$

You obtain a Z-statistic of ____ which is ______ with $\alpha = .05$

(a) -0.535; not statistically significant
(b) 1.96; statistically significant
(c) 2.576; statistically significant
(d) -5.35; statistically significant
(e) 1.645; not statistically significant
(f) -0.535; statistically significant

23 Using the data from the previous problem, construct a 95% confidence interval for the mean of local students. The endpoints of the interval are

(a) $78.2; 111.1$
(b) $75.05; 114.25$
(c) $82.54; 101.87$
(d) $68.89; 120.41$

24 Suppose you wish to test the hypothesis that

$$H_0 : \mu = 50$$

against the alternative

$$H_1 : \mu \neq 50$$

The population standard deviation is not known, so you must estimate it from sample data. You gather data on $N = 30.0$ people, and find that $\overline{X} = 56.44$, and the sample standard deviation is $s = 17.53$. The Student t-statistic for these data is t =_____, degrees of freedom are ______, and the critical value for significance with $\alpha = .01$ is _____.

(a) 2.0122; 29; 2.045
(b) 2.0122; 30; 2.756
(c) 0.11478; 29; 2.750
(d) 2.0122; 29; 2.756
(e) 2.0122; 29; 2.457
(f) 2.0122; 29; 2.750
(g) 0.11478; 29; 2.756
(h) 2.0122; 30; 2.045