STA 6166 – Exam 3 – Spring 2016 **PRINT** Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Conduct all Tests at  = 0.05 significance level.**

Q.1. A researcher is interested in determining whether people’s attitudes toward a political candidate is effected by exposure to an advertisement for the candidate. Subjects were asked if they had a positive attitude toward the candidate prior to seeing the video (Yes or No). The subjects then watched an hour-long television show, with advertisement being played during the TV show. Afterwards, the subjects were again asked whether they had a positive attitude toward the candidate (Yes or No). Which method of analysis would be appropriate?

 **Pearson’s Chi-Square Test Fisher’s Exact Test McNemar’s Test Test for Ordinal Association**

Q.2. A study was conducted with large samples of British, Belgian, and Norwegian food consumers being classified into one of 5 classifications (naïve, sensible, skeptical, denying, or other). If we wished to test whether there was an association between classification and nationality, we would reject the null hypothesis of no association, if the test statistic falls in the range:

  **> 3.841 > 5.991 > 7.815 > 9.488 > 11.070 > 15.507 Need to know sample sizes**

Q.3. A Randomized Block Design (when it is feasible to be conducted) is generally preferred to a Completely Randomized Design because it typically increases the experimental error variance for a given sample size.

**TRUE / FALSE**

Q.4. If in a sample of individuals, classified on 2 ordinal scales, 75% of all combined Concordant and Discordant pairs are concordant, then the estimate of Gamma will be:

 **0.75 -0.75 0.50 -0.50 0.25 -0.25 0 None of the above**

Q.5. A study was conducted, with samples of 2 brands of cars, and whether or not the car could reach a given speed in a given amount of time (Pass or Fail). The researchers sampled 10 cars from each brand, and found that 3 of Brand A did pass the test, and 1 from Brand B did. Fill in the contingency table for this outcome, and the table for the more extreme outcome in favor of Brand A, given the marginal totals.



Q.6. In a test of the endowment effect, the following experiment was conducted with data given below.

* 3 Gift Conditions (Explanatory Variable): Subject given a mug (1), given candy bar (2), given nothing (3)
* 2 Possible Outcomes: Preference between Mug (1) or Candy (2)

We wish to test H0: No association between Gift Condition and Product preference



p.6.a. Complete the table of Expected Counts under the null hypothesis.

p.6.b. Give the rejection region for the chi-square test: Reject H0 if the test statistic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

p.6.c. Compute the contribution to the chi-square statistic for the upper left cell of the table (Given Mug / Prefer Mug)

p.6.d. Based on p.6.b. and p.6.c., the P-value for the fully computed chi-square statistic is **> 0.05** or **< 0.05**

p.6.e. Let NM be the population proportion who had been given nothing who prefer the mug to the candy bar. Compute a 95% Confidence Interval for NM Note: Use only information from observed values of Condition 3

Q.7. An ergonomic study was conducted to compare comfort ratings among 3 chair models (treatments). The study involved 12 subjects (blocks) who each rated each chair (in random order) in a Randomized Block Design (RBD).

p.7.a. Complete the Analysis of Variance table.



p.7.b. Compute the Relative Efficiency of the RBD versus a Completely Randomized Design (CRD). How many subjects per treatment would be needed to have equivalent standard errors of chair type means?

Relative Efficiency \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ # of Subjects per treatment in CRD \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

p.7.c. Compute Tukey’s Honest Significant difference (W) for comparing treatment means.

*W*ij = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Q.8. A study considered the effect of juvenile criminal offenders being tried as adults. A sample of 2097 youths tried as adults were matched pairwise with 2097 youths tried as juveniles, with matching based on prior criminal behavior. The response was whether or not the youth was re-arrested during a subsequent follow-up period. The data are given below where the counts are the number of the 2097 pairs that fall in that cell of the table. Let J be the true probability of a youth tried as a Juvenile to be re-arrested, and A be similarly defined for a youth tried as an Adult. Use McNemar’s test to test: 



p.8.a. Compute the test statistic and rejection region for this test.

Test Statistic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rejection Region: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

p.8.b. Which statement best describes the conclusion?

 **Tried as Adult has higher probability Tried as Juvenile has higher Probability No Difference**

Q.9. A study was conducted to compare adverse events between two dose levels of Escitalopram (10 mg, and 20 mg). Among n10 = 535 subjects receiving the 10 mg dose, y10 = 105 reported symptoms of nausea. Among n20 = 542 subjects receiving the 20 mg dose, y20 = 125 reported symptoms of nausea. These are independent samples.

p.9.a. Complete the following contingency table:



p.11.b. Compute the following quantities:



p.9.c. Given the following quantities 

p.9.c.i) Test H0: versus HA:≠

Test Statistic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rejection Region \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ P-value **< .05** **or > .05**