Advanced Statistics Chapter 10 Quiz Review 1 Name :

Use the following for Questions 1 - 2

Sixty-eight people from a random sample of 128 residents in Uppsala, Sweden, had blue eyes. 45 people from a random sample of 110 people from Preston England had blue eyes. Let p_1 represent the proportion of people in Uppsala with blue eyes and let p_2 represent the proportion of people in Preston with blue eyes

1. If researchers suspected that the distribution of eye colour is different in these two countries before collecting the data, which of the following hypotheses would be appropriate to test ?

   (A) $H_0: p_1 = 0.53, p_2 = 0.41; H_a: p_1 \neq 0.53, p_2 \neq 0.41$

   (B) $H_0: p_1 = p_2 = 0.47\ ; H_a: p_1 \neq p_2 \neq 0.47$

   (C) $H_0: p_1 = p_2\ ; H_a: p_1 > p_2$

   (D) $H_0: p_1 = p_2\ ; H_a: p_1 \neq p_2$

   (E) $H_0: p_1 = p_2\ ; H_a: p_1 < p_2$

2. The P-value for this test is 0.06. If the researchers chose a significance level of $\alpha = 0.05$ which of the following represents the correct conclusion to draw from this result ?

   (A) We reject H_o ; there is evidence to suggest a difference in proportion of blue-eyed people in these two countries

   (B) We fail to reject H_o ; there is convincing evidence to suggest a difference in proportion of blue-eyed people in these two countries

   (C) We fail to reject H_o ; there is insufficient evidence to suggest a difference in proportion of blue-eyed people in these two countries

   (D) We accept H_a ; there is a sufficient evidence that Excellent cures headaches faster than Simple

   (E) Accept H_o ; there is insufficient evidence to suggest a difference in proportion of blue-eyed people in these two countries

Use the following for questions 3 – 4

Janice and her cousin Linda are a little competitive about the relative merits of their home towns. One contest they had was to determine who had more rainy days. They found the weather records on the internet and each of them randomly selected 60 days from the past 5 years. Janice found that there had been measurably rainfall on 17 of the 60 days she selected for Asheville, and Linda found that there had been measurably rainfall in 12 of the 60 days she selected for Lincoln. They intend to perform a test of significance on their data, using the hypotheses $H_0: p_A - p_L = 0$; $H_a: p_A - p_L \neq 0$ and the 0.05 significance level.

3. Janice and Linda's test statistic is 1.07. Which of the following is closest to the appropriate P-value for this test ?

(A) 0.0446

(B) 0.0892

(C) 0.1423

(D) 0.1449

(E) 0.2846

4. Which of the following best describes what it would mean if Janice and Linda's test resulted in a Type I error ?

(A) Concluding that there is a difference in the proportion of rainy days in the two cities when there is no difference.

(B) Concluding that there is no difference in the proportion of rainy days in the two cities when there is a difference.

(C) Choosing the wrong test procedure, such as using a z-test instead of a t -test.

(D) Accepting the alternative hypothesis instead of rejecting the null hypothesis.

(E) Accepting the null hypothesis instead of rejecting the alternative hypothesis.

5. A bone marrow transplant from a close relative is a commonly used technique in fighting certain kinds of leukemia. A hospital finds that such a procedure results in recovery 70% of the time. The y are experimenting with a new procedure that uses bone marrow produced in a laboratory. So far they have used the artificial bone marrow in a random sample of 75 patients and 60 have recovered. Is this sufficient evidence to justify the hospital's claims that the experimental procedure has a higher recovery rate than the traditional procedure ?

(A) there is sufficient evidence at $\alpha = 0.01$

(B) there is sufficient evidence at $\alpha = 0.05$

(C) there is not sufficient evidence at $\alpha = 0.05$

(D) there is not sufficient evidence at $\alpha = 0.01$

(E) the sample size is not large enough to answer this question

6. Researchers conduct a study to test a potential side effect of a new allergy medication. 160 subjects with allergies were used for this study. The new "improved" brand I medication was randomly assigned to 80 subjects and the current Brand C medication was randomly assigned to the other 80 subjects. 14 of the 80 patients with Brand I reported drowsiness and 22 of the 80 patients with Brand C reported drowsiness.

(a) State the parameter our confidence interval will estimate.

(b) Identify each of the conditions that must be met to use this procedure, and explain how you know that each one has been satisfied.

(c) Find the appropriate critical value and standard error of the sample proportion.

(d) Give the 90% confidence interval.

(e) Interpret the confidence interval constructed in part (d) in the context of the problem.

(f) Does the interval in part (a) provide evidence that the side effect of drowsiness is different with the new medication.

(g) Would you make the same conclusion in part (b) if you conducted a hypothesis test ? Explain.

TOTAL : /25