**Biology 180 Practice Exam 1 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Spring 2015**

**Question 1 2 points**

You survey a population of twinflower plants and find that genotypes at the R gene have the following frequencies (the three alleles involved are R1, R2, and R3):

R1R1: 0.15

R1R2: 0.10

R2R2: 0.20

R2R3: 0.20

R1R3: 0.10

R3R3: 0.25

Are the genotype frequencies in Hardy-Weinberg proportions? (Assume yes if all <3% of expectation; otherwise no) If so, explain what this means. If not, explain the nature of the discrepancy between observed and expected.

Sample answer:

No—they are not. There are FAR too many homozygotes observed (and/or FAR too few heterozygotes observed), compared to the frequencies expected under H-W.

Rubric:

For full credit (2 points), the answer must be no and the explanation must be correct.

Award partial credit (1 point) if the answer is no but the explanation is not correct.

Award no credit (0 points) if the answer is yes.

**Question 2 2 points**

Using your data on twinflower plants, and assuming the Hardy-Wienberg model as the null hypothesis, you perform a statistical test and get a p-value of 0.07. What does this p-value represent?

Sample answer:

If the Hardy-Weinberg model was correct, we would expect to see genotype frequencies as weird as the ones we observed 7% of the time.

The probability of getting results as unexpected as those that we observed is 0.07, under the Hardy-Weinberg hypothesis.

Rubric:

1pt: Probability of (or how often we expect to see) data like ours,

1pt: given the null hypothesis is true.

**Question 3 2 points**

**Question 4 2 points**