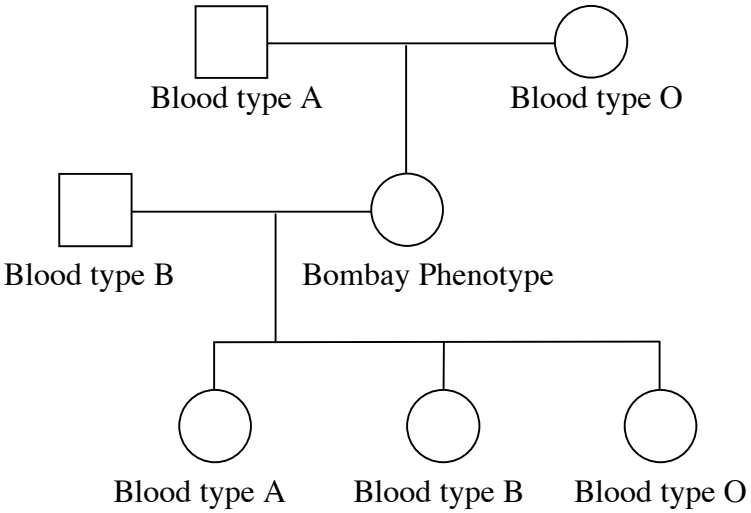
Biology 305 Genetics
Problem Set 2

Name _____

By printing your name above you acknowledge that while there may have been group discussions of these problems, the work below is yours.

I want to encourage you to work together on these problems, but make sure you understand how to solve each problem on your own. Show all of your work. No credit will be given for answers without work. If a question requires you to determine a genotype show how you obtained it. Please write neatly. If I can't read it, I can't grade it. The homework is due Wednesday, February 17th before class begins. If it is handed in after class has started there is a 5-point deduction and a further 5 points for each day it is late.

1. We have discussed the genetics of the ABO blood type locus and the role that the different alleles play in determining a person's blood type. We also discussed the genetic interaction between the ABO locus and the H locus that can result in the Bombay phenotype. The pedigree below shows a family that has one family member showing the Bombay phenotype. Assign genotypes for the ABO locus and the H locus to each individual. Assume that the two O blood types are **NOT** due to the Bombay phenotype.



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2. In carnations, some plants have red flowers and other plants have white flowers. You are interested in determining the genetics behind the red flower phenotype. You take a homozygous red plant and cross it with a homozygous white plant. All of the F1 carnation plants have red flowers. When you take the F1 plants and cross them together, the F2 appear in a ratio of 9/16 red flowers and 7/16 white flowers.

- Give the genotypes for the red and white flowers in each generation:

  Parental Genotypes

  F1 Genotype

  F2 Genotypes

- You repeat the same set of crosses that are outlined above, but this time you do them at 30°C by mistake (your initial crosses were done at 20°C). When you look at the F2 plants they now appear in a ratio of 12/16 red flowers and 4/16 white flowers. Given that the plants have the same genotype as those in part "a", what is a possible explanation for this different outcome?