GENETIC PROBLEMS

1. Let’s assume that in the human species hair colour is inherited by a gene that has two alleles. The allele for black hair is represented by letter A. Its recessive allele which controls blond hair is represented by a. A blond hair man marries a black hair woman (whose mother had blond hair) Write down the ratios of genotypes and phenotypes in the F1.
2. Imagine that blue-coloured eyes in humans is determined by a recessive allele, and brown-coloured eyes is controlled by the dominant allele. A man with blue eyes married a woman with brown eyes, whose mother had blue eyes and whose father had brown eyes. The woman also had a brother with blue eyes. The couple had a brown eyed child. Write down and explain the genotypes of all people mentioned in the problem.
3. A woman with group AB blood marries a man with group B blood (heterozygous) Write down the ratios of genotypes and phenotypes in the F1.
4. A man with group Rh+ blood (who already had a son with group Rh -  blood from a previous marriage), marries a woman of the same blood group (whose father was Rh - ) Write down the ratios of genotypes and phenotypes in the F1.
5. The flowers of a kind of plant can be red, pink or white. A plant with red flowers is crosses with a plant with pink flowers. Write down the ratios of genotypes and phenotypes in the F1.
6. In a kind of plant, yellow-coloured seed is determined by allele A dominant to the allele for green-coloured seed. A yellow-coloured seed plant is crossed with a green-coloured seed plant. In the F1 we have 10 plants with yellow seed and 8 plants with green seed. What are the genotypes and the phenotypes of the parents and their offspring?
7. An albino guinea pig (which parents are both black) is crossed with a black one (which parents are one black and the other albino) How would the genotypes be of the mating guinea pigs and of their offspring?
8. In a hospital four couples have had a child each. The name tags of the new borns have been lost and you must solve the problem giving each couple their child. The blood groups of the children are: 0, B, A and AB. The blood groups of the couples are AB x 0, A x 0, Ax AB and 0 x 0.
9. Phenylketonuria (PKU) is an inherited disease determined by a recessive allele (the dominant allele in the locus produces the normal phenotype) A normal man and a normal woman would like to know what is the probability of them having a child afflicted with the disease. We know that the parents of the woman are both normal. However, the father of the man had the disease even though the mother was normal. Explain your answer.