Refer to the following pedigree. This pedigree shows the inheritance of blood groups over three generations. In each generation (I, II, III etc) individuals are identified by numbering from the left to right across the pedigree (I.1, II.2, III.3 etc). Each individual’s blood type is listed next to their number if known.

I

**1** B **2** A

II

**1** A **2** O **3** ? **4** O

III

**1** B **2** A

(a) What is the blood phenotype of II.3?

(1 mark)

(b) What are the genotypes of III.1 and III.2?

(2 marks)

(c) Are any of the children in generation II homozygous? Explain.

(2 marks)

(d) Blood group inheritance is termed co-dominant. What does this term mean?

(2 marks)

(e) If Individuals II.3 and II.4 have a third child, what is the probability that it will be a male with blood group A? Show your working.

(2 marks)

A friend gave you a copy of their ‘family tree’ or pedigree displaying an inheritance pattern of a single trait going back four generations. He explained to you that the trait is a ‘sex-linked recessive’ trait, but was unable to explain why several males were affected. Discuss what information the pedigree would contain for a ‘sex-linked recessive’ trait and how this type of trait is passed on from parents to children.

Your friend later discloses to you that the trait shown is Duchenne Muscular Dystrophy. Describe what happens to a person with this genetic disorder?