1. **Mendelian disorders are primarily caused by:**
   A. Multiple gene interactions
   B. Single gene variation or mutation
   C. Chromosome duplication only
   D. Environmental factors (B)

Explanation : Mendelian disorders are caused mainly by variation or mutation in a single gene and their inheritance can be traced through pedigree analysis.

2. **Haemophilia is a:**
   A. Autosomal dominant disorder
   B. Sex-linked recessive disorder
   C. Autosomal recessive disorder
   D. Chromosomal disorder (B)

Explanation : Haemophilia is an X-linked recessive disorder transmitted mainly from carrier females to male offspring.

3. **In haemophilia, the affected protein is related to:**
   A. Digestion
   B. Blood clotting
   C. Oxygen transport
   D. Immune response (B)

Explanation : Haemophilia occurs due to defects in a protein involved in blood clotting, causing uncontrolled bleeding.

4. **Colour blindness is caused due to defects in:**
   A. Blue pigment cells
   B. Red or green colour-sensitive cones
   C. Platelets
   D. Haemoglobin molecules (B)

Explanation : Colour blindness results from defects in red or green colour-sensitive cone cells, causing difficulty in distinguishing colours.

5. **Sickle cell anaemia is inherited as a:**
   A. Sex-linked recessive trait
   B. Autosomal dominant trait
   C. Autosomal recessive trait
   D. Y-linked trait (C)

Explanation : Sickle cell anaemia is an autosomal recessive disorder controlled by alleles HbA and HbS.

6. **In sickle cell anaemia, glutamic acid is replaced by:**
   A. Glycine
   B. Valine
   C. Alanine
   D. Tyrosine (B)

Explanation : A point mutation causes replacement of glutamic acid by valine at the sixth position of the beta-globin chain.

7. **Phenylketonuria occurs due to deficiency of the enzyme:**
   A. Haemoglobin
   B. Phenylalanine hydroxylase
   C. Insulin
   D. Tyrosinase (B)

Explanation : Phenylketonuria is caused due to lack of the enzyme required for conversion of phenylalanine into tyrosine.

8. **Thalassemia results from decreased synthesis of:**
   A. DNA chains
   B. Globin chains of haemoglobin
   C. Platelet proteins
   D. Enzymes of digestion (B)

Explanation : Thalassemia occurs due to reduced synthesis of one of the globin chains (α or β) forming haemoglobin.

9. **β-thalassemia is controlled by a gene located on:**
   A. Chromosome 16
   B. Chromosome 11
   C. X chromosome
   D. Y chromosome (B)

Explanation : β-thalassemia is controlled by a gene located on chromosome 11 affecting β-globin chain production.

10. **Queen Victoria's descendants were affected by:**
    A. Colour blindness
    B. Haemophilia
    C. Sickle cell anaemia
    D. Thalassemia (B)

Explanation : Queen Victoria was a carrier of haemophilia, which was transmitted to many descendants.