1.

Death is a natural and necessary part of life cycles at all levels of organization.

(a) Discuss **TWO** examples of how cell death affects the development and functioning of a multicellular organism.

(b) Discuss **ONE** example of how substances are degraded and reused in cells.

(c) Discuss the evolutionary significance of death.

2.

The physical structure of a protein often reflects and affects its function.

(a) **Describe** THREE types of chemical bonds/interactions found in proteins. For each type, **describe** its role in determining protein structure.

(b) **Discuss** how the structure of a protein affects the function of TWO of the following.

- Muscle contraction
- Regulation of enzyme activity
- Cell signaling

(c) Abnormal hemoglobin is the identifying characteristic of sickle cell anemia. **Explain** the genetic basis of the abnormal hemoglobin. **Explain** why the sickle cell allele is selected for in certain areas of the world.

3.

Reproduction can be either asexual or sexual.

(a) Using a specific example, **describe** how organisms can reproduce asexually. **Discuss** TWO evolutionary advantages of asexual reproduction.

(b) **Identify** THREE ways that sexual reproduction increases genetic variability. For each, **explain** how it increases genetic diversity among the offspring.

(c) **Discuss** TWO prezygotic isolating mechanisms that prevent hybridization between two species. Include in your discussion an example of each mechanism.