

PART IV. LONGER ANSWERS. Write your name legibly on the next page and clearly answer

ANY TWO of the following. Drawings may help; please label them. (15 points each)

1. Explain why overdosing on vitamin A is a greater risk than overdosing on vitamin C.
2. Colorblindness is an X-linked trait in humans. (a) Diagram a pedigree showing how a colorblind individual can have parents with normal vision. (b) Give the genotypes and phenotypes of all individuals in the cross you have drawn. (c) Explain which individuals in both past and future generations are likely to show colorblindness.
3. Explain the difference between science policy issues and other types of issues that arise in the case of applied science. Illustrate with an issue of your choice, such as legislation requiring childhood vaccination, efforts to clean up toxic waste sites, or another issue of your choice.
4. Explain how certain sugars (specify which ones), nitrogen-containing bases, and phosphate groups are combined to make DNA molecules. Use illustrations.
5. Select **ANY TWO** of the following topics: peppered moths, mimicry, South American mammals, frogs on oceanic islands. For each of the two topics you have selected, explain how it can be used to support Darwin's paradigm **AND** to argue against other alternative explanations.
6. Explain the differences between primary, secondary, tertiary, and quaternary protein structure.
7. Draw a chart showing the fate of different nutrients as they pass through the human digestive system.
8. Explain at least five important differences between procaryotic and eucaryotic cells.
9. Outline the steps in the production of human insulin by bacteria.
10. Explain why it is beneficial: (a) to substitute plant proteins for animal proteins and (b) to combine plant proteins from several sources.
11. Explain how Griffith's experiment showed that DNA contained hereditary information.