The foundations of biochemistry: questionnaire assignment

Environment, Air

What is the underlying, organizing biochemical principle that results in the chemical similarity of virtually all living things? Given this biochemical similarity, how is the structural and functional diversity of living things possible? Anus: Living things are composed primarily of macromolecules, polymers of simple compounds of Just a few different types. The properties of these polymers are determined by their sequence of monomers and these can be combined in many different ways.

Diversity is thus achieved through the nearly limitless variety of sequences that can exist when amino acids are linked to form proteins, nucleotides are linked to form nucleic acids, and incarcerations are linked to form polysaccharides. Branching in the latter can contribute additional heterogeneity. Each type of organism constructs a unique set of macromolecules from these monomers units, resulting in the structural and functional diversity among species. 32. Chemical foundations Page: 14 Difficulty: 2 Name two functions of (a) proteins, (b) nucleic acids, (c) polysaccharides, (d) lipids.

Anus: Many answers are possible including: (a) proteins function as enzymes, structural elements, signal carriers, transporters; (b) nucleic acids store and transmit genetic information and act as both structural and catalytic elements; (c) oligarchies serve as energy-yielding fuel stores and cellular and extracurricular fuel stores, and cellular signals. 33. Chemical Foundations Page: 16 Difficulty: 2 Why is an asymmetric carbon atom called a choral center? Anus: An asymmetric carbon has four different subsistent

attached, and cannot be superimposed on its mirror image-?? as a right hand cannot fit into a left glove.

Thus a molecule with one choral carbon will have two storerooms, which may be distinguishable from one another in a biological system. 34. Chemical foundations pages: 15-16, 18 Difficulty: 3 Differentiate between configuration and conformation. Anus: Configuration denotes the spatial arrangement of the atoms of a molecule that is conferred by the presence of either double bonds, around which there is no freedom of rotation, or choral centers, which give rise to storerooms. Configurations isomers can only be interconnected by temporarily breaking covalent bonds.

Conformation refers to the spatial arrangement of substituted groups that, without breaking any bonds, are free to assume different positions in space because of the freedom of bond rotation. 35. Chemical foundations Pages: 16-17 Difficulty: 3 (a) What is optical activity? B) How did Louis Pasteur arrive at an explanation for the phenomenon of optical activity? Anus: (a) Optical activity is the capacity of a substance to rotate the plane of plane-polarize light. (b) Using fine forceps, he was able to separate the two types of crystals found in tartaric acid (racemes acid) that are identical in shape, but mirror images of each other.

One sample rotated polarize light to the left; the mirror image crystals rotated polarize light to the right. 36. Chemical foundations Pages: 18-19 Difficulty: 3 A chemist working in a pharmaceutical lab synthesized a new drug as a racemes suture. Why is it important that she separate the two

moisteners and test each for its biological activity? Anus: Bimolecular such as receptors for drugs are stereoscopic, so each of the two moisteners of the drug may have very different effects on an organism.

One may be beneficial, the other toxic; or one mentioned may be ineffective and its presence could reduce the efficacy of the other mentioned. 37. Chemical foundations Explain why living organisms are able to produce particular choral forms of different bimolecular while laboratory chemical synthesis usually produces a racemes mixture. Anus: Laboratory syntheses usually use choral reagents and thus produce racemes mixtures of products. In contrast, because all enzymes are made of choral precursors, all enzymes are inherently choral catalysts.

Thus, they will show strong stereotypically in reactants and mechanisms, leading to the production of choral products. 38. Physical foundations Page: 20 Difficulty: 2 Proteins are constantly being synthesized in a living cell. Why doesn’t the number of protein molecules become too great for the cell to contain, leading to cell destruction? Anus: The proteins in a cell are continuously being synthesized and degraded. The cell maintains a dynamic steady state in which the amount of each protein remains fairly constant at the level required under given conditions.