**Chapter 8. Carbohydrates**

**Understand the fundamental structures, group classification, and stereochemistry of monosaccharides.**

**Be able to mechanistically show the cyclization of monosaccharides to form hemiacetals and hemiketals.**

**Know the fundamental reactions and derivatives of monosaccharides and disaccharides including sugar acids, sugar alcohols, phosphate esters of sugars, amino sugars, etc.**

**Be able to recognize the structures and functions of the polysachharides discussed in lecture**

**Chapter 9. Biological Membranes and Membrane Transport**

**Know the structure and properties of the lipids typically found in biological membranes**

**Be able to describe the biological roles of membranes**

**Be able clearly describe the ordered structures formed by lipids in water**

**Understand the general properties and components of the Fluid mosaic model of biological membranes**

**Understand and be able to succinctly describe the asymmetric properties of membranes and how asymmetry is created**

**Understand the nature and properties of proteins typically found in membranes**

**Be able to related the structural properties of the examples of membrane proteins discussed ( i.e. Porins, Glycophorin)**

**Be able to describe the various types of membrane transport and how thermodynamic equilibria influences these processes**

**Understand the typical secondary and tertiary structures of membrane proteins involved in transport**

**Be able to draw and explain the transport of ions via the Na/K ATPase pump and compare its function to the Ca2+ pump found in muscles (pay particular attention to enzyme conformation)—reflected in the reading**

Understand **secondary active transport mechanisms**

**Be able to define symport and antiport as they relate to secondary active transport—reflected in the reading**

**Chapter 13. Enzyme Kinetics**

**Know the six classes of enzymes (Table 13.1)**

**Understand how enzymes catalyze biochemical reactions.**

**Understand the importance of cofactors and coenzymes to enzyme catalysis**

**Be able to distinguish between a holoenzyme and apoenzyme**

**Be able to accurately determine the rate law, reaction order, and molecularity of a given enzymatic or chemical reaction**

**Understand the kinetic equations that govern enzyme catalyzed reactions.**

**Be able to derive and use the Michaelis-Menton equation to determine various kinetic constants (including Km, Vmax, *v*, kcat) for a given enzymatic reaction**

**Be able to show the dependence of reaction velocity on substrate concentration for an enzyme that follows Michaelis-Menten kinetics**

**Be able to explain the importance of the assumptions involved in the Michaelis-Menton kinetic model.**

**Be able to calculate turnover number for proteins containing either a single or several active sites.**

**Understand the significance of catalytic efficiency**

**Understand the derivation and utility of the Lineweaver-Burke plot in analyzing kinetic data from enzymatic reactions.**

**Understand the different types of enzyme inhibition and how they affect kinetic constants.**

**Be able to quickly generate Michaelis-Menton and Lineweaver-Burke plots for enzymatic reactions in the presence and absence of various types of inhibitors.**

**Be able to draw Cleland diagrams and explain reactions involving multiple substrates.**

**Understand the importance of affinity labels in determining enzyme mechanisms.**

**Be able to use your knowledge of previous material and all of the principles outlined above to interpret data and make conclusions about an enzyme’s function.**

**Chapter 14. Mechanisms of Enzymes**

**Understand the binding and chemical modes of catalysis**

**Be able to predict the catalytic functions of reactive groups of ionizable amino acids.**

**Know how pH relates to enzymatic rates and be able to interpret and generate pH profile if given essential information regarding an enzyme’s mechanism.**

**Be able to explain the importance of metal ions found in metalloenzymes.**

**Know the importance of transition state stabilization in enzyme catalysis.**

**Understand the properties of serine proteases.**

**Know the elements of the catalytic mechanism of chymotrypsin and be able to identify the essential modes of catalysis within the mechanism.**

**Understand the roles of the polar amino acids involved in serine protease activity and be able to apply these roles to other enzymes.**

**Be able to compare and contrast the catalytic mechanisms of aspartic proteases to serine proteases**

**Know the elements of the catalytic mechanism of lysozyme and be able to identify the essential modes of catalysis within the mechanism.**