

CHEM 4401 E1 Study List

CH	item	Topic
1	1	Living organisms: distinguishing characteristics
1	2	Basic components of cellular structure
1	3	Differences between prokaryotes & eukaryotes
1	4	Organelles: features & functions
1	5	Cytoskeleton: features & functions
1	6	Predominant elements in biochemistry: which & why?
1	7	3 dozen primary biomolecules: 6 major classes or compounds
1	8	Major biochemical polymers (macromolecules)
1	9	Carbon as the central biochemical element: why?
1	10	Functional groups: structures, roles, electrophiles, nucleophiles
1	11	Stereochemistry: asymmetry, configuration, conformation
1	12	Stereochemistry: enantiomers & diastereoisomers
1	13	Covalent bonds: characteristics
1	14	Weak bonds: H-bonds, Ionic, hydrophobic, vdw, dipole-dipole
1	15	Chemical Reactivity: Electronegativity differences
1	16	Chemical Reactivity: Number of shared valence electrons
1	17	Oxidation state: Carbon bonds & electron "ownership"
1	18	Biochemical reactions: Oxidation-reduction
1	19	Biochemical reactions: C-C bond cleavage & formation
1	20	Biochemical reactions: Internal rearrangements
1	21	Biochemical reactions: Group transfers
1	22	Bioenergetics: internal energy/enthalpy & changes
1	23	Bioenergetics: entropy & entropy changes
1	24	Bioenergetics: free energy & free energy changes
1	25	Bioenergetics: relationship between G, H, T (temp) & S
1	26	Bioenergetics: coupling <i>endergonic</i> to <i>exergonic</i> reactions
2	27	Water: Structure & Properties
2	28	Water-solute interactions: hydrophilic
2	29	Water-solute interactions: hydrophobic
2	30	amphipathic compounds
2	31	Colligative properties of water
2	32	Molecular properties and ionization status
2	33	equilibrium constants (K_{eq}): definition & calculation
2	34	H ₂ O: ionization, K_w , [H ⁺] and [OH ⁻] relationships
2	35	pH scale: definition, calculation, relationship to [H ⁺]
2	36	Acid dissociation reactions, K_a and pK_a
2	37	K_a , pK_a relationship to acid strength
2	38	effect of pH on acid dissociation reactions
2	39	effect of pH on functional group bonding properties
2	40	relationship b/w pH, pK_a and buffering strength
2	41	Henderson-Hasselbach equation
2	42	Titration curves: what information do they provide?
2	43	physiological buffers: phosphate & bicarbonate
2	44	Water as a biochemical reactant