Chapter Two Study Guide
Introduction to Chemistry (W2025)

1. What are the key ideas of the modern atomic theory? What is matter made from? What is the difference between an atom, an element, and a compound?

2. What is the significance of the periodic table? What is the difference between the atomic number and the atomic mass?

3. The evolution of the atomic model went through five revisions. Which model "invented chemistry" because it help to explain chemical bonding?

4. Draw the Bohr model of carbon and label all the parts, with their charges,and weights.

5. What is the octet rule? What are valence electrons? Location?

6. What part of an atom determines the properties of an atom? What determines the chemical bonding properties of an atom?

7. What is the difference between covalent, hydrogen, and ionic bonds? Give examples of each bond type. Rank the bonds from strongest to weakest. What bond is formed by sharing electrons? What bond is formed by donating electrons? Which bond is not used to form compounds?

8. What is the difference between polar and non-polar covalent bonds? Examples.

9. What information will you know from the period or group in the periodic table?

10. What is the difference between a cation and anion?

11. What makes a compound either hydrophobic or hydrophilic?

12. What is a gel state? Water tension? What chemical bond explains these conditions?

13. What is an isomer?

14. What is a free radical? Significance? What electron configuration is responsible for free radicals? Why are free radicals dangerous? How do we eliminate free radicals?

15. What is an isotope? Why are some isotopes radioactive?

16. What is an electrolyte?

17. What are the three types of mixtures? Explain how the particle sizes and light are used to define mixtures. Give examples of each type.

18. What is pH? What are we measuring to determine pH? What is an acid? What is a base? What is a salt? Reference strong acid vs strong base?

19. What is a buffer?

20. Write the chemical formula: carbon dioxide plus water forms carbonic acid forms bicarbonate plus a proton. Why are arrows moving in both directions in the formula? Why is this formula important in human physiology? What law dictates the direction of this formula?

21. What is an enzyme? Nickname? What is the role of the substrate? What may influence the action of an enzyme?

22. What is metabolism? What is the difference between catabolism and anabolism? Which process releases energy? Which process requires energy?

23. What happens in an oxidation-reduction reaction?

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24. What are the four organic compounds? What are the monomers for each compound?

25. What atoms must be present for a compound to be organic? Is carbon dioxide organic?
Is methane organic?

26. What occurs when two compounds are either joined (dehydration synthesis) or split (hydrolysis)?

27. Why are the monocaccharides glucose, galactose, and fructose isomers? What is sucrose? Lactose?

28. What is the difference between starch, cellulose, and glycogen?

29. How are carbohydrates used in human physiology? Are carbohydrates hydrophilic or hydrophobic?

30. Are lipids hydrophobic or hydrophillic? Are lipids less or more reduced than carbohydrates? Significance?

31. What are the components of a triglyceride? What makes one component an acid? Why are triglycerides called neutral? How are triglycerides used in the human body?

32. How is a triglyceride turned into a phospholipid? Is this a neutral or polar fat? Significance? What type of structures may be formed with this compound?

33. What type of compound is cholesterol? Do we metabolize cholesterol for energy? How do we use this compound in the human body?

34. What type of compound make high and low density lipoproteins? Which one is bad? Why?

35.. What are protein monomers? Hydrophobic or hydrophilic? Basic structure vs R group? How is the structure of a protein held stable?

36. What happens when a protein is denatured? What may denature a protein? Give examples. How do we use proteins in the human body? Significance?

37. What are nucleotides? Structural components? Polymer called? Significance? What is the difference between RNA and DNA? Do we use nucleotides for energy?

38. What is ATP? Significance?

39. What is glycolysis (anarobic respiration)? What is the Kreb cycle/electron transport chain (aerobic respiration)? Location for each metabolic pathway? How much ATP is made by each pathway?