Anatomy and Physiology Placement Exam 2 Practice
with Answers at End!

General Chemical Principles

1. _____ bonds are characterized by the sharing of electrons between the participating atoms.
    a. hydrogen
    b. ionic
    c. covalent
    d. electrical

2. A chemical bond in which electrons are gained or lost is called a(n) _____ bond.
    a. ionic
    b. covalent
    c. hydrogen
    d. electrical

3. An electron is a(n)
    a. negatively charged subatomic particle
    b. molecule with a neutral charge
    c. neutral atom of an element
    d. uncharged subatomic particle

4. A subatomic particle possessing no electrical charge is called a(n)
    a. ion
    b. neutron
    c. atom
    d. electron

5. All isotopes of a particular element possess
    a. identical atomic weights
    b. the same number of neutrons, but different numbers of electrons
    c. the same number of protons, but different numbers of neutrons
    d. identical atomic weights and numbers

6. An atom or a group of atoms possessing a positive or negative electrical charge is called a(n):
    a. molecule
    b. compound
    c. element
    d. ion

7. ^{14}Carbon has an atomic number of 6, but has 8 neutrons. How many electrons are present in each atom?
    a. 6
    b. 8
    c. 14
    d. some have 6 and some have 8

8. Chlorine must gain one electron to fill its outer energy level completely. Potassium must lose one electron in order to possess a completely filled outer energy level. What type of bond would you expect to find in potassium chloride?
    a. covalent
    b. ionic
    c. hydrogen
    d. it cannot be determined from the information given

9. Atomic number is determined by the number of _____ in each atom.
    a. protons only
    b. protons and electrons
    c. protons and neutrons
    d. protons, neutrons, and electrons

10. Atoms of the element carbon have four electrons in the outermost shell. What is the maximum number of single covalent bonds that can form between one atom of carbon and other atoms?
    a. 1
    b. 2
    c. 3
    d. 4

Water, Acids, Bases and pH

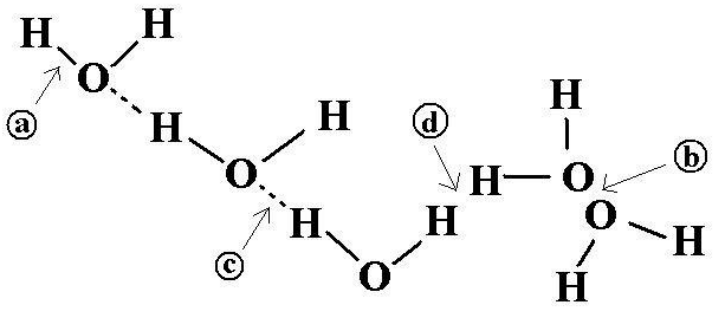
11. What determines the pH of a solution?
    a. the number of ionic bonds available
    b. the hydrogen ion concentration
    c. the strength of the hydrogen bonds present
    d. the number of water molecules available

12. Identify the mismatched pair:
    a. hydrophilic – polar molecules
    b. hydrogen ion – proton
    c. acid solution – pH more than 7
    d. water – universal solvent

13. Which of the following qualities of water is largely responsible for the phenomenon known as capillary action?
    a. Water is relatively transparent.
    b. Water expands slightly as it freezes.
    c. Water is strongly cohesive.
    d. Water has a high heat capacity.

14. Which of the following qualities of water is largely responsible for the ability of small insects to walk directly on the surface of water?
    a. Water is relatively transparent.
    b. Water displays a measurable surface tension.
    c. Water expands as it freezes.
    d. Water demonstrates an observable phase transition.

Use the following picture of water molecules for questions 15 and 16.

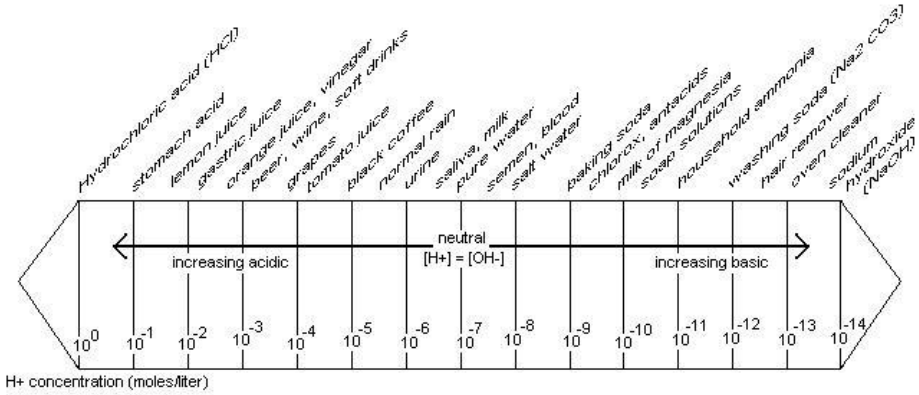


15. Which arrow points to a hydrogen bond?

16. Which arrow points to a covalent bond?

17. Among solutions with the following pH values, the one that has the greatest concentration of protons is the one with a pH value of
    a. 3
    b. 7
    c. 10
    d. 12

Use the following figure to answer questions 18 and 19.



18. What is the pH of baking soda?
    a. 10
    b. 9
    c. 8
    d. 7

19. Which of the following statements is true about a solution with a pH of 9, one with a pH of 2 and one with a pH of 7?
    a. The pH 2 solution has a higher hydrogen (H^+) ion concentration than the pH 7 solution.
    b. The pH 2 solution has a higher hydroxyl (OH^-) ion concentration than the pH 7 solution.
    c. The pH 9 solution has a higher hydrogen (H^+) ion concentration than the pH 2 solution.
    d. The pH 9 solution has a hydrogen (H^+) ion concentration that is seven times higher than that of the pH 2 solution.

Organic Molecules

20. Organic chemistry is the chemistry of
    a. oxygen molecules
    b. isotopes
    c. carbon compounds
    d. ionic bonds

21. Organic molecules contain particular elements. Based on what you know of organic chemistry, find the mismatched pair.
    a. carbohydrate - CHO
    b. lipid - CHNOP
    c. protein - CHNOPS
    d. nucleic acid - CHNOP

22. A molecule with the formula $C_5H_{10}O_5$ is a(n)
    a. carbohydrate
    b. steroid
    c. fat
    d. amino acid

23. Simple sugars are also known as
    a. polymers
    b. monosaccharides
    c. disaccharides
    d. polysaccharides

24. Which of the following is a condensation (dehydration synthesis) reaction?
    a. the linking together of two glucose molecules
    b. the breakdown of a polymer into monomers
    c. a reactions that consumes a water molecule
    d. an enzyme reaction that divides water into two subunits

25. Each amino acid has a different
    a. amino group
    b. carboxyl group
    c. R group
    d. peptide bond

26. A pentose sugar, a phosphate group and a nitrogen-containing base are found in a(n)
    a. amino acid
    b. nucleotide
    c. lipid
    d. carbohydrate

27. In a theoretical monosaccharide, there are 18 atoms of hydrogen. How many atoms of oxygen are present?
    a. 6
    b. 9
    c. 11
    d. 22

28. Amino acids are the building blocks or monomers for
    a. nucleic acids
    b. proteins
    c. carbohydrates
    d. lipids

Cell Structure

29. Aerobic cellular respiration occurs in the
    a. mitochondria
    b. ribosomes
    c. nucleolus
    d. cytoplasm

30. Detoxification of certain potentially poisonous molecules occurs in the
    a. peroxisomes
    b. lysosomes
    c. rough ER
    d. Golgi complex

31. The site of protein formation in the cell is the
    a. mitochondria
    b. Golgi complex
    c. lysosomes
    d. ribosomes

32. This organelle is the command and control center of the cell
    a. mitochondria
    b. nucleus
    c. Golgi complex
    d. centrioles

33. Identify the mismatched pair
    a. ribosome synthesis – nucleolus
    b. rough endoplasmic reticulum – attached ribosomes
    c. Golgi apparatus – lytic enzymes
    d. cytoskeleton – microtubules

34. Proteins that are secreted outside the cell in the process of exocytosis are released by
    a. secretory vesicles
    b. Golgi complex
    c. vacuoles
    d. rough ER

35. Cilia and flagella are specialized structures used
    a. in mitosis
    b. for locomotion
    c. to maintain cell shape
    d. as cellular supports

36. The mitochondria are organelles that
    a. convert their DNA into food for the cell
    b. produce ATP from the chemical energy of food
    c. produce ATP from the chemical energy of their DNA
    d. convert the chemical energy of food into DNA

37. Why are ribosomes attached to the endoplasmic reticulum (ER)?
    a. Newly synthesized polypeptides can move directly through the ER membrane.
    b. The new protein is more easily released directly into the cytoplasm.
    c. Ribosomes help prevent the ER from leaking material out of the cell.
    d. Ribosomes are involved in steroid synthesis and chemical detoxification.

Cellular Transport

38. Diffusion is the process by which a substances moves from an area of
    a. lower temperature to an area of higher temperature
    b. higher temperature to an area of lower temperature
    c. lower concentration to an area of higher concentration
    d. higher concentration to an area of lower concentration

39. A diffusion equilibrium is reached when
    a. individual molecules stop moving
    b. molecular motion is not random
    c. there is no net movement between two areas
    d. a concentration gradient is established

40. Osmosis is a special case of
    a. diffusion that involves the movement of water across a membrane
    b. facilitated diffusion that involves the movement of sodium
    c. active transport that involves the movement of water
    d. diffusion that involves the movement of water via the sodium-potassium pump

41. The net movement of water across a selectively permeable membrane is always
    a. from the hypertonic solution to the hypotonic one
    b. from the hypotonic solution to the hypertonic one
    c. from the equilibrium solution to the hypertonic one
    d. from the equilibrium solution to the isotonic one

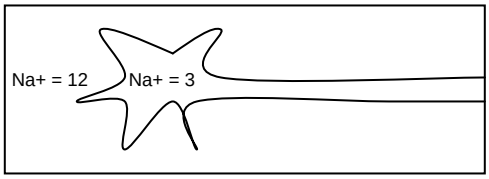
42. The direction of osmosis is determined by the
    a. pH of both solutions
    b. temperature of the fluid and that of the membrane
    c. concentration of dissolved solutes on both sides of the membrane.
    d. temperature of the solutions

43. _____ is the process by which the undigested contents of food vacuoles are removed from the cell.
    a. Phagocytosis
    b. Pinocytosis
    c. Exocytosis
    d. Vacuolation

44. A cell placed in a beaker of sea water will
    a. actively transport water out
    b. shrink due to the loss of water by osmosis
    c. swell due to gain of water by osmosis
    d. be largely unaffected and not changed appreciably in size or appearance

45. A hypothetical "microbullet" shot through a phospholipid bilayer would pass the components in which order?
    a. polar >>> nonpolar>>>polar>>>nonpolar
    b. polar>>>polar>>>nonpolar>>>nonpolar
    c. nonpolar>>>polar>>>polar>>>nonpolar
    d. polar>>>nonpolar>>>nonpolar>>>polar

Use the following picture of a neuron (nerve cell) to answer questions 46-47.



46. The concentration of Na^+ is _____ outside the cell than inside; therefore, the Na+ will move _____ the cell.
    a. greater…into
    b. lower…out of
    c. greater…out of
    d. lower…into

47. When a neuron is stimulated and Na^+ ions move through an open Na^+ channel, the process is
    a. endocytosis
    b. osmosis
    c. facilitated diffusion
    d. active transport

Enzymes and Energy

48. Enzymes are important as
    a. raw materials for building body parts
    b. a source of energy for metabolic processes
    c. hormones
    d. catalysts for chemical reactions

49. Nearly all of the energy available on the earth comes from
    e. the core of the planet
    b. the sun
    c. volcanoes
    d. the oceans

50. What is activation energy?
    a. chemical energy released from any reaction
    b. the energy required to start a chemical reaction
    c. energy released from a reaction that does not involve molecular oxygen
    d. a tremendous amount of energy that is spontaneously generated during a chemical reaction

51. Enzymes
    a. frequently violate both the first and second law of thermodynamics
    b. lower activation energy requirements
    c. can affect the energy released from a chemical reaction
    d. slow metabolic reactions

52. The reactants in an enzyme catalyzed reaction are called
    a. substrates
    b. products
    c. complex
    d. active site

53. The information about the synthesis of enzymes comes from
    a. ATP
    b. DNA
    c. lipid molecules
    d. specific complex carbohydrates

54. With few exceptions, all enzymes that have been identified are
    a. high energy phosphate molecules
    b. nucleic acids
    c. complex lipids or carbohydrates
    d. proteins

Organization within the Human Body

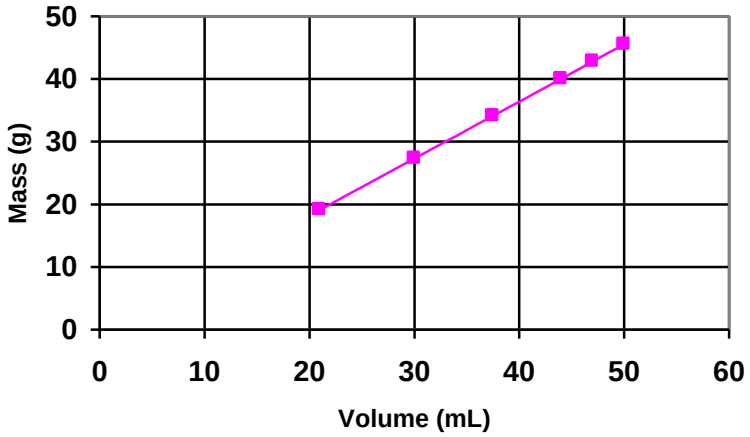
55. Lungs, heart, or brain are examples of
    a. systems
    b. organs
    c. cell tissues
    d. organelles

56. Pick the answer that ranks the following from smallest to largest.
    a. atoms, organs, cells, organisms, organ systems
    b. atoms, cells, tissues, organs, organisms
    c. cells, atoms, organ systems, organs, organisms
    d. organism, organ systems, organs, atoms, cells

57. Circulatory, respiratory, or digestive are examples of
    a. systems
    b. organs
    c. cell tissues
    d. organelles

Graphs

Use the graph below for questions 58-60.



58. An appropriate title for this graph would be
    a. Volume and mass
    b. How volume effects mass
    c. The increasing relationship between volume and mass
    d. Mass as a function of volume

59. If the volume of a liquid is 40 mL, the mass is
    a. 25 g
    b. 37 g
    c. 40 g
    d. 45 g

60. The relationship between mass and volume could best be described as
    a. Increasing mass decreases volume
    b. Increasing volume results in a decrease of mass
    c. Increasing volume results in an increase of mass
    d. There is no relationship between mass and volume

ANSWERS:

1. C	13.C	25.C	37.A	49.B
2. A	14.B	26.B	38.D	50.B
3.A	15.C	27.B	39.C	51.B
4.B	16.A	28.B	40.A	52.A
5.C	17.A	29.A	41.B	53.B
6.D	18.B	30.A	42.C	54.D
7.A	19.A	31.D	43.C	55.B
8.B	20.C	32.B	44.B	56.B
9.A	21.B	33.C	45.D	57.A
10.D	22.A	34.A	46.A	58.D
11.B	23.B	35.B	47.C	59.B
12.C	24.A	36.B	48.D	60.C