

These questions include knowledge, comprehension and application of the material discussed in class. Some questions are more difficult than normal so that you will use your notes and textbook. Do your best.

If you have questions, please do not hesitate to ask for assistance (Office SM 254 or email steh@saddleback.edu). Good luck!!!

This is by no means everything that will be on the test. I've tried to put some representative questions on this practice exam for you to work on.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1. What are the basic "building blocks" of DNA?
a) four nucleotides b) protein c) 26 nucleotides d) carbohydrates and lipids e) 20 amino acids
2. What is a hypothesis?
a) a fact b) a tentative explanation c) an untestable idea d) a verifiable observation
e) the same thing as a theory
3. A controlled experiment is one in which
a) there are at least two groups, one differing from the other by two or more variables.
b) the experiment is repeated many times to ensure that the results are accurate.
c) the experiment proceeds at a slow pace to guarantee that the scientist can carefully observe all reactions and process all experimental data.
d) there are at least two groups, one of which does not receive the experimental treatment.
e) there is one group for which the scientist controls all variables.
4. Which of these is an example of an organelle?
a) digestive system b) amoeba c) muscle d) stomach e) chloroplast
5. Once labor begins in childbirth, contractions increase in intensity and frequency until delivery. Therefore, the increasing labor contractions of childbirth are an example of
a) a feedforward mechanism. b) negative feedback. c) positive feedback.
d) feedback inhibition. e) both C and D.
6. Species that are in the same _____ are more closely related than species that are only in the same _____.
a) class ... order b) phylum ... class c) family ... genus d) kingdom ... phylum
e) family ... order
7. Which of these is the best description of the science of biology?
a) the study of the way humans interact with their environment b) the study of life
c) the study of biodiversity d) the study of humans e) the study of rocks
8. A maple leaf is at which level in the hierarchical organization of life?
a) organelle b) organ c) tissue d) organism e) population
9. One of the key distinctions between prokaryotic and eukaryotic cells is the presence of _____ cells, which is lacking in _____ cells.
a) DNA in eukaryotic ... prokaryotic b) a nucleus in prokaryotic ... eukaryotic
c) a nucleus in eukaryotic ... prokaryotic d) DNA in prokaryotic ... eukaryotic
e) a cytoplasmic organelle in prokaryotic ... eukaryotic
10. Which four elements make up approximately 96% of living matter?
a) carbon, sulfur, phosphorus, hydrogen
b) carbon, oxygen, sulfur, calcium
c) oxygen, hydrogen, calcium, sodium
d) carbon, sodium, chlorine, magnesium
e) carbon, hydrogen, nitrogen, oxygen

11. The mass number of an element can be easily approximated by adding together the number of
 a) protons and neutrons. b) electron orbitals in each energy level. c) isotopes of the atom.
 d) protons and electrons. e) neutrons and electrons.
12. Oxygen has an atomic number of 8. Therefore, it must have
 a) 8 protons. b) 8 electrons. c) 16 neutrons.
 d) Only A and B are correct. e) A, B, and C are correct.
13. How does one refer to an atomic form of an element containing the same number of protons but a different number of neutrons?
 a) polar atom b) ion c) radioactive d) isomer e) isotope
14. How do isotopes differ from each other?
 a) number of protons b) ability to form ions c) number of neutrons
 d) valence electron distribution e) number of electrons
15. Which of the following best describes the relationship between the atoms described below?
- | | |
|--------|--------|
| Atom 1 | Atom 2 |
| 31 | 32 |
| P | P |
| 15 | 15 |
- a) They are both radioactive. b) They contain 31 and 32 protons respectively.
 c) They are both phosphorous cations. d) They are both phosphorous anions.
 e) They are both isotopes of phosphorous.
16. A covalent chemical bond is one in which
 a) outer-shell electrons are shared by two atoms so as to satisfactorily fill the outer electron shells of both.
 b) the inner-shell electrons of one atom are transferred to the outer shell of another atom.
 c) outer-shell electrons of one atom are transferred to the inner electron shells of another atom.
 d) protons or neutrons are shared by two atoms so as to satisfy the requirements of both.
 e) electrons are removed from one atom and transferred to another atom so that the two atoms become oppositely charged.
17. What are the maximum number of covalent bonds an element with atomic number 16 can make with hydrogen?
 a) 4 b) 2 c) 1 d) 5 e) 3
18. The ionic bond of sodium chloride is formed when
 a) sodium and chlorine share an electron pair.
 b) sodium gains an electron from chlorine.
 c) sodium and chlorine both lose electrons from their outer valence shells.
 d) chlorine gains an electron from sodium.
 e) chlorine gains a proton from sodium.
19. The partial negative charge at one end of a water molecule is attracted to the partial positive charge of another water molecule. What is this attraction called?
 a) an ionic bond b) a hydrophilic bond c) a hydrogen bond d) a hydrophobic bond
 e) a covalent bond
20. Water is transported in plant tissues against gravity due to which of the following properties?
 a) cohesion b) hydrogen bonding c) adhesion d) two of the above e) all of the above
21. Desert rabbits are adapted to the warm climate because their large ears aid in the removal of heat by
 a) the buffering capacity of water. b) the high specific heat of water.
 c) the high heat of vaporization of water. d) the high surface tension of water.
 e) the dissociation of water molecules.
22. Which of the following solutions has the greatest concentration of hydroxide ions [OH-]?
 a) seawater at pH 8 b) lemon juice at pH 2 c) vinegar at pH 3
 d) urine at pH 6 e) tomato juice at pH 4

23. Which of the following represents the correct sequence of levels in life's hierarchy, proceeding downward from an individual animal?
- brain, spinal cord, organ system, nerve cell, nervous tissue;
 - organ system, population of cells, nervous tissue;
 - organism, cardiovascular system, heart, cardiac tissue, myocardial cell;
 - organism, intestinal cells, digestive system, pancreas;
24. If the pH of a solution is decreased from 7 to 6, it means that the
- concentration of OH to power of (-) has increased to 10 times what it was at pH 7.
 - concentration of H to power of (+) has increased to 10 times what it was at pH 7.
 - concentration of H to power of (+) has decreased to 10 times of what it was at pH 7.
 - concentration of OH to power of (-) has decreased 10 times what it was at pH 7.
 - Both B and D are correct.
25. Which of the following statements is true about buffer solutions? They
- tend to maintain a relatively constant pH.
 - maintain a constant pH when bases are added to them but not when acids are added to them.
 - will always have a pH of 7.
 - are rarely found in living systems.
 - cause a lowering of pH when acids are added to them.
26. To keep the produce looking fresh, grocery stores will periodically spray a _____ solution onto them
- isotonic;
 - hypertonic;
 - hypotonic;
27. Polymers of polysaccharides, fats, and proteins are all synthesized from monomers by
- connecting monosaccharides together.
 - the addition of water to each monomer.
 - the formation of disulfide bridges between monomers.
 - ionic bonding of the monomers.
 - the removal of water (dehydration reactions).
28. Large numbers of ribosomes are present in cells that specialize in producing which of the following molecules?
- starches
 - lipids
 - proteins
 - glucose
 - steroids
29. Which of the following is not a part of the endomembrane system?
- rough endoplasmic reticulum
 - mitochondria
 - smooth endoplasmic reticulum
 - Golgi apparatus
 - lysosomes
30. Of the following, which is probably the most common route for membrane flow in the endomembrane system?
- tonoplast → plasma membrane → nuclear envelope → smooth ER
 - nuclear envelope → lysosome → Golgi → plasma membrane
 - ER → chloroplasts → mitochondrion → cell membrane
 - Golgi → lysosome → ER → plasma membrane
 - rough ER → vesicles → Golgi → plasma membrane
31. Organelles that contain DNA include
- ribosomes.
 - mitochondria.
 - chloroplasts.
 - Only B and C are correct.
 - A, B, and C are correct.
32. A cell has the following molecules and structures: enzymes, DNA, ribosomes, plasma membrane, and mitochondria. It could be a cell from:
- a plant, but not an animal.
 - a plant or an animal.
 - an animal, but not a plant.
 - a bacterium.
 - any kind of organism.
33. The presence of cholesterol in the plasma membranes of some animals
- enables the animal to add hydrogen atoms to unsaturated phospholipids.
 - makes the animal more susceptible to circulatory disorders.
 - makes the membrane less flexible, so it can sustain greater pressure from within the cell.
 - enables the animal to remove hydrogen atoms from saturated phospholipids.
 - enables the membrane to stay fluid more easily when cell temperature drops.

34. All of the following are functions of membrane proteins except
 a) protein synthesis. b) signal transduction. c) transport. d) intercellular joining. e) cell-cell recognition.
35. Of the following functions, the glycoproteins and glycolipids of animal cell membranes are most important for
 a) the ability of cells to recognize like and different cells.
 b) facilitated diffusion of molecules down their concentration gradients.
 c) maintaining the integrity of a fluid mosaic membrane.
 d) maintaining membrane fluidity at low temperatures.
 e) active transport of molecules against their concentration gradients.
36. Which of the following would likely move through the lipid bilayer of a plasma membrane most rapidly?
 a) starch b) glucose c) K^+ d) an amino acid e) CO_2
37. Celery stalks that are immersed in fresh water for several hours become stiff and hard. Similar stalks left in a salt solution become limp and soft. From this we can deduce that the cells of the celery stalks are
 a) hypotonic to both fresh water and the salt solution.
 b) hypotonic to fresh water but hypertonic to the salt solution.
 c) hypertonic to both fresh water and the salt solution.
 d) isotonic with fresh water but hypotonic to the salt solution.
 e) hypertonic to fresh water but hypotonic to the salt solution.
38. The movement of a substance across a biological membrane against its concentration gradient with the help of energy input is which of the following?
 a) exocytosis b) diffusion c) active transport d) osmosis e) facilitated diffusion
39. The membrane activity most nearly opposite to exocytosis is
 a) phagocytosis. b) facilitated diffusion. c) osmosis. d) active transport. e) plasmolysis.
40. White blood cells engulf bacteria through what process?
 a) pinocytosis b) phagocytosis c) receptor-mediated exocytosis
 d) osmosis e) exocytosis
41. What is the cause of familial hypercholesterolemia?
 a) a general lack of glycolipids in the blood cell membranes
 b) poor attachment of the cholesterol to the extracellular matrix of liver cells
 c) inhibition of the cholesterol active transport system in red blood cells
 d) defective LDL receptors on the membranes of liver cells
 e) a poorly formed lipid bilayer that cannot incorporate cholesterol into the membranes of liver cells
42. Which of the following is true concerning saturated fatty acids?
 a) They are the predominant fatty acid in corn oil.
 b) They have a higher ratio of hydrogen to carbon than do unsaturated fatty acids.
 c) They are usually liquid at room temperature.
 d) They have double bonds between the carbon atoms of the fatty acids.
 e) They are usually produced by plants.
43. What maintains the secondary structure of a protein?
 a) disulfide bridges b) peptide bonds c) electrostatic charges
 d) hydrogen bonds e) ionic bonds
44. Altering which of the following levels of structural organization could change the function of a protein?
 a) secondary b) primary c) tertiary d) Only A and B are correct.
 e) A, B, and C are correct.
45. Which of the following best describes the relationship between proteins, RNA, DNA, and genes in humans?
 a) RNA → DNA → genes → proteins
 b) genes → proteins → RNA → DNA
 c) proteins → RNA → DNA → genes
 d) genes → RNA → DNA → proteins
 e) DNA → genes → RNA → proteins