

Practice A & P Placement Exam I (answers on last page)

1. Which of the following is the correct order of complexity, going from least to most complex?
 - a. Atom, molecule, organelle, cell, tissue, organ
 - b. Organ, tissue, cell, organelle, atom, molecule
 - c. Organ, tissue, cell, organelle, molecule, atom
 - d. Molecule, atom, organ, tissue, cell, organelle
 - e. Atom, molecule, organelle, cell, organ, tissue

2. Organelles are
 - a. Cells
 - b. Organisms
 - c. A group of cells that serve a common function
 - d. Compartments within cells
 - e. Proteins

3. Tissues are
 - a. A group of cells that serve a common function
 - b. Compartments within cells
 - c. Proteins
 - d. Organisms
 - e. Cells

4. Tissues are grouped together in functional units called
 - a. Organelles
 - b. Cells
 - c. Organisms
 - d. Organs

5. The subatomic particles that play the greatest role in cellular chemical reactions are
 - a. Protons
 - b. Neutrons
 - c. Electrons
 - d. Isotopes

6. The mass within in an atom comes from
 - a. Protons only
 - b. Protons and neutrons
 - c. Electrons only
 - d. Protons, neutrons, and electrons
 - e.

7. An atom whose atomic number is 10 has how many electrons in its outermost energy level?
 - a. 8
 - b. 10
 - c. 2
 - d. 3
 - e. 5

8. Isotopes are atoms of the same element that differ in their
 - a. Number of electrons
 - b. Number of neutrons
 - c. Number of protons
 - d. Ionic charge

9. Which of the following are found in the nucleus of an atom?
- Protons
 - Neutrons
 - Electrons
 - A and B
 - A, B, and C
10. An element with 22 protons, 22 neutrons, and 22 electrons would have an atomic number of
- 44
 - 22
 - 66
 - 11
11. Which of the following results from the making of a bond?
- Atoms become more reactive
 - Molecules are broken down
 - Electrons are destroyed
 - Atoms become more stable
12. For an atom to be considered an ion
- Protons can outnumber neutrons
 - Protons can outnumber electrons
 - Neutrons can outnumber protons
 - Protons equal electrons
13. An atom becomes an ion when
- It gains or loses neutrons
 - It forms a covalent bond
 - It gains or loses electrons
 - Hydrogen ions are shared
 - It gains or loses protons
14. Hydrogen bonds are very important in the functional shape of
- Proteins
 - Sugars
 - Fats
 - Nucleic acids
 - Both A and D are true
15. The symbol 3CO_2 represents
- 3 molecules of carbon dioxide
 - 3 carbon atoms and 1 molecule of oxygen
 - 1 atom of carbon and 3 atoms of oxygen
 - 1 atom and 3 of carbon
16. In a bottle of water, hydrogen bonding occurs between the hydrogen of 1 atom and
- A hydrogen atom in the same molecule
 - An oxygen atom in a different molecule
 - An oxygen atom in the same water molecule
 - A hydrogen atom in a different molecule

17. Which of the following is *not* a compound?
- A protein
 - Glucose
 - Methane
 - Sodium
 - Table salt
18. Atoms form bonds to
- Fill their outer shells with neutrons
 - Obtain an equal number of protons and electrons
 - Fill their outer shells with electrons
 - Fill their outer shells with protons
 - Obtain an equal number of protons and neutrons
19. Water is a polar molecule because
- Oxygen is more electronegative than hydrogen
 - Hydrogen has more neutrons than oxygen
 - Oxygen has more electrons than hydrogen
 - Oxygen has more neutrons than hydrogen
 - Hydrogen is more electronegative than oxygen
20. H₂S is an example of a
- Structural formula
 - Ball-and-stick formula
 - Molecular formula
 - Space-filling model
 - None of the above
21. Potassium has one electron in its fourth shell, and chloride has seven electrons in its third shell. Which of the following is most likely to be true?
- Chloride will give an electron to potassium to form an ionic bond
 - Potassium will give an electron to chloride to form an ionic bond
 - The two atoms will share the electron unequally in a polar bond
 - The two atoms will share an electron equally in a covalent nonpolar bond
22. Nitrogen has seven protons, and hydrogen has one proton. Based on your knowledge of the rules of covalent bonding and using the periodic table to determine the number of electrons in each, which of the following molecules will form from the reaction of nitrogen and hydrogen?
- NH₅
 - NH₃
 - NH
 - NH₂
 - NH₄
23. You mix sugar in water and stir until it's completely dissolved. In this system, the water is the _____, the sugar is the _____ and the end result is a _____.
- Solute; solution; solvent
 - Solute; solvent; solution
 - Solvent; solution; solute
 - Solution; solvent; solute
 - Solvent; solute; solution

24. Each element has a unique _____, which refers to the number of protons present in its atoms.
- Isotope
 - Mass number
 - Atomic number
 - Radioisotope
25. A molecule is _____.
- A bonding together of two or more atoms
 - Less stable than its constituent atoms separated
 - Electrically charged
 - A carrier of one or more extra neutrons
26. If lithium has an atomic number of 3, and an atomic mass of 7, it has _____ neutron(s) in its nucleus.
- 1
 - 2
 - 3
 - 4
 - 7
27. Substances that are nonpolar and repelled by water are _____.
- Hydrolyzed
 - Nonpolar
 - Hydrophilic
 - Hydrophobic
28. A hydrogen bond is _____.
- A sharing of a pair of electrons between a hydrogen nucleus and an oxygen nucleus
 - A sharing of a pair of electrons between a hydrogen nucleus and either an oxygen or nitrogen nucleus
 - Formed when an electronegative atom of a molecule weakly interacts with a hydrogen atom that is already participating in a polar covalent bond
 - None of the above
29. An ionic bond is one in which _____.
- Electrons are shared equally
 - Electrically neutral atoms have a mutual attraction
 - Two charged atoms have a mutual attraction due to electron transfer or donation
 - Electrons are shared unequally
30. A covalent bond is one in which _____.
- Electrons are shared
 - Electrically neutral atoms have a mutual attraction
 - Two charged atoms have a mutual attraction due to electron transfer
 - Electrons are lost
31. Lipids _____.
- Include fats that are broken down into one fatty acid molecule and three glycerol molecules
 - Are composed of monosaccharides
 - Include triglycerides that serve as energy sources
 - Include cartilage and chitin

32. DNA _____.

- a. Is one of the adenosine phosphates
- b. Is one of the nucleotide coenzymes
- c. Contains protein-building instructions
- d. Is composed of monosaccharides

33. A nonpolar covalent bond implies that _____.

- a. One negative atom bonds with a hydrogen atom
- b. The bond is double
- c. There is no difference in charge at the ends (the two poles) of the bond
- d. Atoms of different elements do not exert the same pull on shared electrons

34. A solution with a pH of 11 is _____ times as basic as one with a pH of 8.

- a. 2
- b. 3
- c. 10
- d. 100
- e. 1,000

35. Carbon is part of so many different substances because _____.

- a. Carbon generally forms 2 covalent bonds with a variety of other atoms
- b. A carbon atom generally forms four covalent bonds with a variety of atoms
- c. Carbon ionizes easily
- d. Carbon is a polar compound

36. A solution with a pH of 4 has _____.

- a. Equal number of H^+ ions and OH^- ions
- b. More OH^- ions than H^+ ions
- c. More H^+ ions than OH^- ions
- d. Alkaline or basic properties

37. Hydrolysis could be correctly described as the _____.

- a. Heating of a compound in order to drive off its excess water and concentrate its volume
- b. Breaking of a long-chain compound into its subunits by adding water molecules to its structure between the subunits
- c. Linking of two or more molecules by the removal of one or more water molecules
- d. Constant removal of hydrogen atoms from the surface of a carbohydrate
- e. Process of condensation in reverse

38. Genetic instructions are encoded in the base sequence of _____; molecules of _____ function in processes using genetic instructions to construct proteins

- a. DNA; DNA
- b. DNA; RNA
- c. RNA; DNA
- d. RNA; RNA

39. Membranes consist of _____.

- a. A phospholipid bilayer
- b. proteins
- c. glycolipids and glycoproteins
- d. cholesterol
- e. all of the above are correct

40. The nucleolus is the site where
- The protein and RNA subunits of ribosomes are assembled
 - The chromatin is formed
 - Chromosomes are bound to the inside of the nuclear envelope
 - Chromosomes duplicate themselves
41. The _____ is free of ribosomes and curves through the cytoplasm like connecting pipes; the main site of lipid synthesis.
- Lysosome
 - Golgi body
 - Smooth ER
 - Rough ER
42. Mitochondria convert energy stored in _____ to forms that the cell can use, principally ATP.
- Water
 - Carbon compounds
 - NADPH₂
 - Carbon dioxide
43. _____ are sacs of enzymes. They digest or break down worn out organelles so that the material can be recycled and reused by the cell.
- Lysosomes
 - Glyoxysomes
 - Golgi bodies
 - Peroxisomes
44. Two classes of cytoskeletal elements underlie nearly all movements of eukaryotic cells; they are _____
- Desmins and vimentins
 - Actin and microfilaments
 - Microtubules and microfilaments
 - Microtubules and myosin
45. White blood cells use _____ to devour disease agents invading your body.
- Diffusion
 - Bulk flow
 - Osmosis
 - Phagocytosis
46. In a lipid bilayer, tails point inward and form a(n) _____ region that excludes water.
- Acidic
 - Basic
 - Hydrophilic
 - Hydrophobic
47. A protistan adapted to life in a freshwater pond is collected in a bottle and transferred to a saltwater bay. Which of the following is likely to happen?
- The cell bursts
 - Salts flow out of the protistan cell
 - The cell shrinks
 - Enzymes flow out of the protistan

48. Which of the following is *not* a form of active transport?
- Sodium-potassium pump
 - Endocytosis
 - Exocytosis
 - Bulk flow
49. Which of the following is *not* a form of passive transport?
- Osmosis
 - Passive transport
 - Bulk flow
 - Exocytosis
50. O_2 , CO_2 , H_2O , and other small, electrically neutral molecules move across the cell membrane by_____.
- Electric gradients
 - Receptor-mediated endocytosis
 - Passive transport
 - Active transport
51. Ions such as H^+ , Na^+ , K^+ , and Ca^{++} move across cell membranes against its concentration gradient by_____.
- Receptor mediated endocytosis
 - Pressure gradients
 - Passive transport
 - Active transport
52. An important principle of the second law of thermodynamics states that _____.
- energy can be transformed into matter, and because of this, we can get something for nothing
 - energy can only be destroyed during nuclear reactions, such as those that occur inside the sun
 - if energy is gained by one region of the universe, another place in the universe also must gain energy in order to maintain the balance of nature
 - matter tends to become increasingly more disorganized
53. Essentially, the first law of thermodynamics states that _____.
- one form of energy cannot be converted into another
 - entropy is increasing in the universe
 - energy cannot be created or destroyed
 - energy cannot be converted into matter or matter into energy
54. An enzyme is best described as _____.
- an acid
 - protein
 - a catalyst
 - a fat
 - both b and c
55. Which is not true of enzyme behavior?
- Enzyme shape may change during catalysis
 - The active site of an enzyme orients its substrate molecules, thereby promoting interaction of the reactive parts
 - All enzymes have an active site where substrates are temporarily bound
 - An individual enzyme can catalyze a wide variety of different reactions

56. When NAD^+ combines with hydrogen, the NAD^+ is _____.
- reduced
 - oxidized
 - phosphorylated
 - denatured
57. A substance that gains electrons is _____.
- oxidized
 - a catalyst
 - reduced
 - a substrate
58. As to major function, NAD^+ , FAD, and NADP^+ are classified as _____.
- enzymes
 - phosphate carriers
 - cofactors that function as coenzymes
 - end products of metabolic pathways
59. When a phosphate bond is linked to ADP it then makes ATP, this bond _____.
- absorbs a large amount of free energy when the phosphate group is attached during hydrolysis
 - is formed when the ATP is hydrolyzed to ADP and one phosphate group
 - is usually found in each glucose molecule; that is why glucose is chosen as the starting point for glycolysis
 - releases a large amount of usable energy when the phosphate group is split off during hydrolysis
60. An allosteric enzyme _____.
- has an active site where substrate molecules bind and another site that binds with intermediate or end-product molecules
 - is an important energy-carrying nucleotide
 - carries out either oxidation reactions or reduction reactions but not both
 - raises the activation energy of the chemical reaction it catalyzes
61. Glycolysis would quickly halt if the process ran out of _____, which serves as the hydrogen and electron acceptor.
- NADP^+
 - ADP
 - NAD^+
 - H_2O
62. The ultimate electron acceptor in aerobic respiration is _____.
- NADH
 - carbon dioxide
 - oxygen (O_2)
 - ATP
63. When glucose is used as an energy source, the largest amount of ATP is generated by the _____ portion of the entire respiratory process.
- glycolytic pathway
 - acetyl-CoA formation
 - Krebs cycle
 - electron transport chain

64. What is the name of the process by which reduced NADH transfers electrons along a chain of acceptors to oxygen so as to form water and in which the energy released along the way is used to generate ATP?
- glycolysis
 - acetyl-CoA formation
 - the Krebs cycle
 - the electron transport chain
65. Pyruvic acid can be regarded as the end product of _____.
- glycolysis
 - acetyl-CoA formation
 - fermentation
 - the Krebs cycle
66. ATP production by chemiosmosis involves _____.
- H^+ concentration and electric gradients across a membrane
 - ATP synthesis
 - formation of ATP in the inner mitochondrial compartment
 - all of the above
67. During the fermentation pathways, a net yield of two ATP is produced from _____; the NAD^+ necessary for _____ is regenerated during the fermentation reactions.
- the Krebs cycle; glycolysis
 - glycolysis; electron transport phosphorylation
 - the Krebs cycle, electron transport phosphorylation
 - glycolysis; glycolysis
68. The replication of DNA occurs _____.
- between the growth phases of interphase
 - immediately before prophase of mitosis
 - during prophase of mitosis
 - during prophase of meiosis
69. Diploid refers to _____.
- having two chromosomes of each type in somatic cells
 - twice the parental chromosome number
 - half the parental chromosome number
 - having one chromosome of each type in somatic cells
70. Somatic cells are _____ cells; germ cells are _____ cells.
- meiotic; body
 - body; body
 - meiotic; meiotic
 - body; meiotic
71. If a parent cell has sixteen chromosomes and undergoes mitosis, the resulting cells will have _____ chromosomes.
- sixty-four
 - thirty-two
 - sixteen
 - eight
 - four

72. The correct order of the stages of mitosis is _____.
- prophase, metaphase, telophase, anaphase
 - telophase, anaphase, metaphase, prophase
 - telophase, prophase, metaphase, anaphase
 - anaphase, prophase, telophase, metaphase
 - prophase, metaphase, anaphase, telophase
73. “The nuclear envelope breaks completely into numerous fine, flattened vesicles. Now the chromosomes are free to interact with microtubules that are extending toward them, from the poles of the forming spindle.”
- These sentences describe the _____ of mitosis.
- prophase
 - metaphase
 - prometaphase
 - anaphase
 - telophase
74. During _____, sister chromatids of each chromosome are separated from each other, and those former partners, now chromosomes move to opposite poles.
- prophase
 - metaphase
 - anaphase
 - telophase
75. In the process of cytokinesis, cleavage furrows are associated with _____ cell division, and cell plate formation is associated with _____ cell division.
- animal; animal
 - plant; animal
 - plant; plant
 - animal; plant
76. Each DNA strand has a backbone that consists of alternating _____.
- purines and pyrimidines
 - nitrogen-containing bases
 - hydrogen bonds
 - sugar and phosphate molecules
77. In DNA, complementary base-pairing occurs between _____.
- cytosine and uracil
 - adenine and guanine
 - adenine and uracil
 - adenine and thymine
78. Adenine and guanine are _____.
- double-ringed purines
 - single-ringed purines
 - double-ringed pyrimidines
 - single-ringed pyrimidines

79. Transcription _____.
- occurs on the surface of a ribosome
 - is the final process in the assembly of protein DNA template
 - occurs during the synthesis of any type of RNA by use of a DNA template
 - is catalyzed by DNA polymerase
80. _____ carry(ies) amino acids to ribosomes, where amino acids are linked into the primary structure of a polypeptide.
- mRNA
 - tRNA
 - Introns
 - rRNA
81. Transfer RNA differs from other types of RNA because it _____.
- transfers genetic instructions from cell nucleus to cytoplasm
 - specifies the amino acid sequence of a particular protein
 - carries an amino acid at one end
 - contains codons
82. _____ and _____ are found in RNA but not in DNA.
- Deoxyribose; uracil
 - Uracil; ribose
 - Deoxyribose; thymine
 - Thymine; ribose

ANSWERS:

- | | | | | |
|-------|-------|------------|-------|-------|
| 1. A | 18. C | 35. B | 52. D | 69. A |
| 2. D | 19. A | 36. C | 53. C | 70. D |
| 3. A | 20. C | 37. B or E | 54. E | 71. C |
| 4. D | 21. B | 38. B | 55. D | 72. E |
| 5. C | 22. B | 39. E | 56. A | 73. A |
| 6. B | 23. E | 40. A | 57. C | 74. C |
| 7. A | 24. C | 41. C | 58. C | 75. D |
| 8. B | 25. A | 42. B | 59. D | 76. D |
| 9. D | 26. D | 43. A | 60. A | 77. D |
| 10. B | 27. D | 44. C | 61. C | 78. A |
| 11. D | 28. C | 45. D | 62. C | 79. C |
| 12. B | 29. C | 46. D | 63. D | 80. B |
| 13. C | 30. A | 47. C | 64. D | 81. C |
| 14. E | 31. C | 48. D | 65. A | 82. B |
| 15. A | 32. C | 49. D | 66. D | |
| 16. B | 33. C | 50. C | 67. D | |
| 17. D | 34. E | 51. D | 68. A | |