

TOSS-UP

1. BIOLOGY; Short Answer: Order the following elements from most abundant to least abundant in the human body: Hydrogen, Carbon, Nitrogen, Oxygen.

ANSWER: OXYGEN, CARBON, HYDROGEN, NITROGEN

BONUS

1. BIOLOGY; Multiple Choice: Which element is present in all organic compounds and some inorganic ones, and makes up 18.5% of the body weight?

- (W) Hydrogen
- (X) Carbon
- (Y) Nitrogen
- (Z) Oxygen

ANSWER: X-CARBON

TOSS-UP

2. BIOLOGY; Short Answer: What are the three domains of life?

ANSWER: ARCHAEA, BACTERIA, EUKARYA

BONUS

2. BIOLOGY; Multiple Choice: Which of the following are typically the smallest?

- (W) Protists
- (X) Bacteria
- (Y) Archaea
- (Z) Fungi

ANSWER: Y-ARCHAEA

TOSS-UP

3. BIOLOGY; Multiple Choice: Which of the following would best be used to determine whether a newly discovered eukaryote should be placed under Kingdom Protista or Kingdom Fungi?

- (W) Mode of nutrition
- (X) Morphology and structure
- (Y) Whether it is unicellular or multicellular
- (Z) Evolutionary history

ANSWER: Z-EVOLUTIONARY HISTORY

BONUS

3. BIOLOGY; Multiple Choice: Two prokaryotes that cannot tolerate extreme conditions and have different morphologies would most likely be placed in different...

- (W) Domains
- (X) Kingdoms
- (Y) Phyla
- (Z) Families

ANSWER: X-KINGDOMS

TOSS-UP

4. BIOLOGY; Multiple Choice: Complete the analogy: Taxonomy is to evolutionary history as evolutionary history is to:

- (W) Morphology
- (X) Genomic analysis
- (Y) Mode of nutrition
- (Z) Era

ANSWER: X-GENOMIC ANALYSIS

BONUS

4. BIOLOGY; Short Answer: What type of bird did Charles Darwin study?

ANSWER: FINCHES

TOSS-UP

5. BIOLOGY; Multiple Choice: Which of the following is not an example of an adaptation to the external environment?

- (W) Tall trees have vascular tissue
- (X) Flying squirrels have webbed skin
- (Y) Sickle cell anemics are resistant to malaria
- (Z) Giraffes have long necks

ANSWER: Y-SICKLE CELL ANEMICS ARE RESISTANT TO MALARIA

BONUS

5. BIOLOGY; Multiple Choice: Both bats and birds have wings because they...

- (W) Are genetically similar
- (X) Live in the same environment
- (Y) Are both vertebrates
- (Z) Are adaptations of skin

ANSWER: X-LIVE IN THE SAME ENVIRONMENT

TOSS-UP

6. BIOLOGY; Multiple Choice: Given that hormone A is antagonistic to hormone B, which of the following is an example of a positive feedback mechanism?

(W) Hormone A lowers the level of substance A in the blood, which causes the secretion of hormone B

(X) Hormone A lowers the level of substance A in the blood, which inhibits the secretion of hormone B

(Y) Substance A causes the secretion of hormone A, which causes the secretion of hormone B

(Z) Substance A causes the secretion of hormone A, which inhibits the secretion of hormone B

ANSWER: X–HORMONE A LOWERS THE LEVEL OF SUBSTANCE A IN THE BLOOD, WHICH INHIBITS THE SECRETION OF HORMONE B

BONUS

6. BIOLOGY; Multiple Choice: Substance A causes the secretion of hormone A. Hormone A inhibits the secretion of hormone B. In order for this to be a positive feedback mechanism, hormone B must...

(W) Cause the secretion of substance A

(X) Inhibit the secretion of substance A

(Y) Cause the secretion of hormone A

(Z) Inhibit the secretion of hormone B

ANSWER: X–INHIBIT THE SECRETION OF SUBSTANCE A

TOSS-UP

7. BIOLOGY; Multiple Choice: A deficiency of which of the following minerals would have the least effect on human health?

(W) Calcium

(X) Phosphorus

(Y) Potassium

(Z) Zinc

ANSWER: Z–ZINC

BONUS

7. BIOLOGY; Short Answer: This element is present in chlorophyll. Deficiency of this element in plants leads to browning. It is also present in enzymes within the nucleus. Name this element.

ANSWER: MAGNESIUM

TOSS-UP

8. BIOLOGY; Short Answer: Order the following minerals from least abundant to most abundant: sodium, magnesium, phosphorus, sulfur, chlorine, potassium, calcium.

ANSWER: CALCIUM, PHOSPHORUS, POTASSIUM, SULFUR, SODIUM, CHLORINE, MAGNESIUM

BONUS

8. BIOLOGY; Multiple Choice: Nitrogen is not found in which of the following compounds?

(W) Substance P

(X) Cortisol

(Y) Maltase

(Z) Ecdysin

ANSWER: X—CORTISOL

TOSS-UP

9. BIOLOGY; Short Answer: In DNA, hydrogen atoms of one strand are attracted to the oxygen atom of the other strand. What kind of intermolecular attraction is this?

ANSWER: HYDROGEN BOND

BONUS

9. BIOLOGY; Short Answer: Ionic and hydrogen bonds play an important role in determining the structure of what kind of macromolecules?

ANSWER: PROTEINS

TOSS-UP

10. BIOLOGY; Multiple Choice: Benzene and cyclohexane do not differ in:

(W) Bond angles

(X) Number of hydrogen atoms

(Y) Number of carbon-carbon pi bonds

(Z) Number of carbon-carbon sigma bonds

ANSWER: Z—NUMBER OF CARBON-CARBON SIGMA BONDS

BONUS

10. BIOLOGY; Short Answer: Morphine binds to what receptors in neurons?

ANSWER: ENDORPHIN RECEPTORS

TOSS-UP

11. BIOLOGY; Short Answer: Give the pH of the following substances to the nearest tenth: human blood, urine, gastric acid, tears.

ANSWER: 7.35-7.45, 6.0, 2.0, 7.4

BONUS

11. BIOLOGY; Short Answer: Fatty acids are acids because which functional group releases a hydrogen ion into solution?

ANSWER: CARBOXYL GROUP

TOSS-UP

12. BIOLOGY; Short Answer: Vascular tissue in plants demonstrates what principle, which allows water to move upward, defying the downward pull of gravity?

ANSWER: ADHESION (ACCEPT: CAPILLARY ACTION)

BONUS

12. BIOLOGY; Multiple Choice: In order for the xylem to conduct water upward, what process must also take place?

- (W) Absorption
- (X) Adsorption
- (Y) Transpiration
- (Z) Transformation

ANSWER: Y-TRANSPIRATION

TOSS-UP

13. BIOLOGY; Multiple Choice: A protein with what property would be most likely to dissolve in water?

- (W) Positively charged
- (X) Negatively charged
- (Y) Charged
- (Z) Un-charged

ANSWER: Y-CHARGED

BONUS

13. BIOLOGY; Short Answer: Which ion functions as a buffer in human blood?

ANSWER: BICARBONATE

TOSS-UP

14. BIOLOGY; Multiple Choice: Which of the following organisms would be able to tolerate the highest pH range?

- (W) E. coli
- (X) C. elegans
- (Y) Mus musculus
- (Z) Euglena

ANSWER: W-E. COLI

BONUS

14. BIOLOGY; Multiple Choice: Plants thrive in a soil pH that is...

- (W) Slightly acidic
- (X) Neutral
- (Y) Slightly basic
- (Z) Strongly basic

ANSWER: W-SLIGHTLY ACIDIC

TOSS-UP

15. BIOLOGY; Short Answer: To the nearest tenth, give the upper limit of the pH range of acid rain.

ANSWER: 5.8

BONUS

15. BIOLOGY; Multiple Choice: Acid rain causes the degradation of...

- (W) Calcium sulfate
- (X) Calcium carbonate
- (Y) Silicon dioxide
- (Z) Cellulose

ANSWER: X-CALCIUM CARBONATE

TOSS-UP

16. BIOLOGY; Multiple Choice: Which isomer is prevalent in the human body and is biologically active?

- (W) D-form
- (X) L-form
- (Y) R-form
- (Z) S-form

ANSWER: X-L FORM

BONUS

16. BIOLOGY; Short Answer: Which isomer is used in medications that must cross the blood-brain barrier to take effect?

ANSWER: D-FORM

TOSS-UP

17. BIOLOGY; Multiple Choice: Which of the following pairs of compounds and functional groups will not form a bond?

- (W) Hydrogen and hydroxide
- (X) Sulfhydryl and sulfhydryl
- (Y) Carboxyl and hydroxide
- (Z) Methyl and hydroxyl

ANSWER: Z-METHYL AND HYDROXYL

BONUS

17. BIOLOGY; Short Answer: Which functional group acts as a base and is usually ionized with a charge of +1?

ANSWER: AMINO

TOSS-UP

18. BIOLOGY; Multiple Choice: Which of the following functional groups is not correctly paired with one of its properties?

- (W) Phosphate; can react exothermically with water
- (X) Carboxyl; ionized with a charge of -1
- (Y) Methyl; forms backbone of carbohydrates
- (Z) Sulfhydryl; forms disulfide bridges in hair

ANSWER: Y-METHYL; FORMS BACKBONE OF CARBOHYDRATES

BONUS

18. BIOLOGY; Multiple Choice: Which of the following functional groups is not correctly paired with a class of compounds that always contains that group?

- (W) Carbonyl; ketones
- (X) Phosphate; DNA nucleosides
- (Y) Amino; endorphins
- (Z) Sulfhydryl; amino acids

ANSWER: Z-SULFHYDRYL; AMINO ACIDS

TOSS-UP

19. BIOLOGY; Multiple Choice: Which of the following is not common to both estradiol and testosterone?

- (W) A benzene ring
- (X) A methyl group
- (Y) An alcohol group
- (Z) A 5-carbon ring

ANSWER: W–A BENZENE RING

BONUS

19. BIOLOGY; Short Answer: Sex hormones belong to what class of macromolecules?
ANSWER: LIPIDS (ACCEPT: FATS; HESITANTLY ACCEPT STEROIDS)

TOSS-UP

20. BIOLOGY; Short Answer: Give the number of single bonds and double bonds in a molecule that contains 1 methyl group, 2 ester linkages, 2 carbonyl groups, and one carboxyl group.

ANSWER: 12 SINGLE BONDS, 5 DOUBLE BONDS

BONUS

20. BIOLOGY; Short Answer: Give the number of oxygen atoms in a molecule that contains 1 methyl group, 2 ester linkages, 2 carbonyl groups, and one carboxyl group.

ANSWER: 8

TOSS-UP

21. BIOLOGY; Multiple Choice: Which of the following carbohydrates is not correctly paired with its subsistent monosaccharides?

- (W) Sucrose; glucose and fructose
- (X) Galactose; glucose and lactose
- (Y) Maltose; glucose and glucose
- (Z) Glycogen; glucose monomers

ANSWER: X–GALACTOSE; GLUCOSE AND LACTOSE

BONUS

21. BIOLOGY; Multiple Choice: Which of the following monosaccharides is not correctly paired with its function?

- (W) Galactose; energy source
- (X) Fructose; energy source
- (Y) Ribulose; intermediary compound in the Calvin Cycle

(Z) Acetone; intermediary compound in glycolysis

ANSWER: Z-ACETONE; INTERMEDIARY COMPOUND IN GLYCOLYSIS

TOSS-UP

22. BIOLOGY; Multiple Choice: Which of the following is not true of beta-1,4 likages?

(W) They are between the first and fourth carbons

(X) They link alpha and beta forms

(Y) They are found between glucose molecules

(Z) They are found in cellulose but not in starch

ANSWER: Y-THEY ARE FOUND BETWEEN GLUCOSE MOLECULES

BONUS

22. BIOLOGY; Short Answer: Which enzyme digests starch?

ANSWER: AMYLASE

TOSS-UP

23. BIOLOGY; Multiple Choice: Glycogen differs from starch in all of the following ways except:

(W) It contains beta-1,4 glycosidic linkages

(X) It is more branched

(Y) It is found primarily in animals

(Z) It is used to produce fat

ANSWER: W-IT CONTAINS BETA-1,4 GLYCOSIDIC LINKAGES

BONUS

23. BIOLOGY; Short Answer: What are the two forms of starch?

ANSWER: AMYLOSE AND AMYLOPECTIN

TOSS-UP

24. BIOLOGY; Short Answer: What type of linkage joins a fatty acid to a tryglyceride?

ANSWER: ESTER LINKAGE

BONUS

24. BIOLOGY; Multiple Choice: All of the following are differences between saturated and unsaturated fats except:

(W) Unsaturated fats are found in plants

- (X) Unsaturated fats contain trans-double bonds
- (Y) Unsaturated fats have a lower melting point
- (Z) Unsaturated fats are bent and have a lower density

ANSWER: X–UNSATURATED FATS CONTAIN TRANS-DOUBLE BONDS

TOSS-UP

25. BIOLOGY; Multiple Choice: Steroids contain:

- (W) 3 6-carbon rings, 1 5-carbon ring, and no open rings
- (X) 4 6-carbon rings, 1 5-carbon ring, and 1 open ring
- (Y) 3 6-carbon rings, 1 5-carbon ring, and 2 open rings
- (Z) 3 6-carbon rings, 1 5-carbon ring, and 1 open ring

ANSWER: Z–3 6-CARBON RINGS, 1 5-CARBON RING, AND 1 OPEN RING

BONUS

25. BIOLOGY; Multiple Choice: A phospholipid does not contain:

- (W) 2 fatty acids
- (X) 1 choline
- (Y) 1 ethanol
- (Z) 1 glycerol

ANSWER: Y–1 ETHANOL

TOSS-UP

26. BIOLOGY; Multiple Choice: Which of the following amino acids is not correctly paired with its polarity?

- (W) Threonine; polar
- (X) Tryptophan; polar
- (Y) Phenylalanine; nonpolar
- (Z) Proline; nonpolar

ANSWER: X–TRYPTOPHAN; POLAR

BONUS

26. BIOLOGY; Multiple Choice: Which of the following amino acids is not correctly paired with its electric charge?

- (W) Lysine; positive
- (X) Arginine; negative
- (Y) Histidine; positive
- (Z) Aspartic acid; negative

ANSWER: X–ARGININE; NEGATIVE

TOSS-UP

27. BIOLOGY; Short Answer: What is the term for the ratio of an objects image to its real size?

ANSWER: MAGNIFICATION

BONUS

27. BIOLOGY; Short Answer: What is the term for the minimum distance two points can be separated and still be distinguished as two points?

ANSWER: RESOLUTION

TOSS-UP

28. BIOLOGY; Multiple Choice: Which of the following types of microscopy is not correctly paired with its description?

- (W) Scanning electron microscopy; surface of the sample is scanned
- (X) Transmission electron microscopy; electron is fired through very thin section of specimen
- (Y) Brightfield; light is passed through speciment
- (Z) Nomarski; low contrast

ANSWER: Z-NOMARSKI; LOW CONTRAST

BONUS

28. BIOLOGY; Short Answer: Which type of microscopy would be used to study the internal structure of a specimen?

ANSWER: TRANSMISSION ELECTRON MICROSCOPY

TOSS-UP

29. BIOLOGY; Multiple Choice: Which of the following types of cytoskeletal filaments is incorrectly paired with one of its functions?

- (W) Microtubules; movement of cilia or flagella
- (X) Intermediate filaments; nuclear lamina
- (Y) Microfilaments; anchorage of nucleus and certain other organelles
- (Z) Microtubules; chromosomal movement during cell division

ANSWER: MICROFILAMENTS; ANCHORAGE OF NUCLEUS AND CERTAIN OTHER ORGANELLES

BONUS

29. BIOLOGY; Short Answer: Arrange the three types of filaments from smallest

diameter to largest diameter.

ANSWER: MICROFILAMENTS, INTERMEDIATE FILAMENTS, MICROTUBULES

TOSS-UP

30. BIOLOGY; Multiple Choice: Which of the following is not a function of actin filaments?

(W) Cell locomotion

(X) Cytoplasmic streaming

(Y) Intracellular motoring

(Z) Contraction of skeletal muscle fibers

ANSWER: Y–INTRACELLULAR MOTORING

BONUS

30. BIOLOGY; Short Answer: Tubulin is a dimer that consists of what two proteins?

ANSWER: ALPHA AND BETA TUBULIN

TOSS-UP

31. BIOLOGY; Multiple Choice: Which of the following is not a type of intermediate filament?

(W) Lamins

(X) Microfibrils

(Y) Neurofilaments

(Z) Vimentins

ANSWER: X–MICROFIBRILS

BONUS

31. BIOLOGY; Multiple Choice: In which types of cells are keratins found in?

(W) Connective tissue cells

(X) Nervous tissue cells

(Y) Epithelial tissue cells

(Z) Epidermal cells

ANSWER: EPITHELIAL

TOSS-UP

32. BIOLOGY; Short Answer: What are the two major groups of microtubule motors?

ANSWER: KINESINS AND DYENINS

BONUS

33. BIOLOGY; Short Answer: Which motors move towards the minus end?

ANSWER: DYENINS

TOSS-UP

33. BIOLOGY; Short Answer: What is the filament arrangement in a cilium?

ANSWER: 9+2

BONUS

33. BIOLOGY; Short Answer: What is the filament arrangement in a basal cilium?

ANSWER: 9+0
