



## **International Subject Test— Biology Practice Test**

The ACT<sup>®</sup> International Subject Test—Biology Practice Test is an official AIST practice test. The full-length Biology practice test consists of items drawn from the International Subject Test Biology formative assessment pool and adhere to the AIST Biology Test Specifications.

This PDF file includes Biology Practice Test questions and answer keys. Taking the AIST Official full-length practice test is the best way to prepare for the two sessions of the AIST Biology test.

# Biology

## Part 1

*45 Minutes—38 Questions*

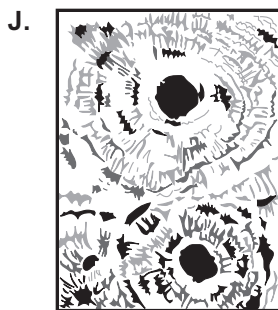
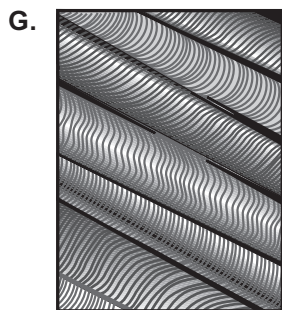
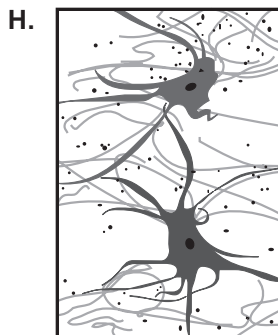
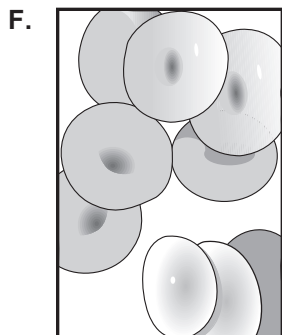
For each question, choose the best answer and select the circle next to it. If you change your mind about an answer, choose a different answer and select the circle next to it.

Your score will be based only on the number of questions you answer correctly during the time allowed. You will **not** be penalized for guessing. **It is to your advantage to answer every question even if you must guess.**

If you finish before time ends, you should use the time remaining to reconsider questions you are uncertain about.

1. How do enzymes speed up chemical reactions?
- A. By reducing activation energy
  - B. By reducing energy produced by the reaction
  - C. By increasing activation energy
  - D. By increasing energy produced by the reaction

2. Which of the following figures represents bone tissue?



3. The hydrolysis of which of the following molecules provides energy for muscle contraction?

- A. ATP
- B. DNA
- C. Lactic acid
- D. Oxygen

4. Nondisjunction can occur during which of the following phases?

- F. Metaphase I only
- G. Anaphase I only
- H. Metaphase I and II only
- J. Anaphase I and II only

5. Lazzaro Spallanzani and Louis Pasteur both performed experiments hoping to disprove the hypothesis that organisms can form by spontaneous generation. Which of the following flasks was included in Pasteur's experiment that was NOT included in Spallanzani's?
- A. A flask that allowed air to enter but did not allow microorganisms to enter
  - B. A flask that did not allow air to enter but did allow microorganisms to enter
  - C. A flask that allowed neither air to enter nor microorganisms to enter
  - D. A flask that allowed both air to enter and microorganisms to enter
6. A veterinary technician administered subcutaneous fluids to a cat. She administered a total of 600 mL of fluid over a period of 7 days with an initial dose of 150 mL on Day 1. The doses on Days 2–7 were different from the initial dose, but equal in volume to each other. How much liquid did she administer on the second day?
- F. 75 mL
  - G. 86 mL
  - H. 150 mL
  - J. 600 mL
7. Alec studied an unknown microscopic, unicellular organism and recorded his observations. He noted that the organism had DNA, ribosomes, and a cell wall, but no nucleus or other membrane-bound organelles. Based on Alec's observations, the organism would be best classified as a:
- A. virus.
  - B. protist.
  - C. fungus.
  - D. bacterium.
8. Which of the following chemical formulas represents an organic molecule?
- F.  $\text{H}_2\text{O}$
  - G.  $\text{AgNO}_3$
  - H.  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$
  - J.  $\text{CuSO}_4 \cdot \text{H}_2\text{O}$
9. Much of the genetic diversity existing in modern multicellular organisms is most likely a result of:
- A. DNA mutations originating in gametes.
  - B. DNA mutations originating in somatic cells.
  - C. protein mutations originating in gametes.
  - D. protein mutations originating in somatic cells.

10. Lions and tigers both belong to the genus *Panthera*. Cheetahs belong to the genus *Acinonyx*. Scientists group these 3 types of cats together at the next most inclusive taxonomic level. Which of these taxonomic levels do lions, tigers, and cheetahs have in common?

- I. Class
- II. Species
- III. Family

- F. I and II only
- G. I and III only
- H. II and III only
- J. I, II, and III

11. According to the biological species concept, when comparing 2 populations (Population 1 and Population 2), which of the following most likely indicates that Population 1 and Population 2 are the same species?

- A. Individuals from Population 1 are the same color as individuals from Population 2.
- B. Individuals from Population 1 consume the same species of prey as individuals from Population 2.
- C. Population 1 actually interbreeds with or has the potential to interbreed with Population 2.
- D. Population 1 inhabits the same general area as Population 2.

12. Based on skeletal type, body symmetry, and body segmentation, which of the following groups of organisms are likely to be the most closely related?

- F. Vertebrates, crustaceans, and flatworms
- G. Echinoderms, cnidarians, and sponges
- H. Centipedes, crustaceans, and insects
- J. Cnidarians, flatworms, and annelid worms

13. Suppose that in humans, a certain type of color blindness is a recessive, X-linked trait. The chromosomes and alleles associated with this type of color blindness are represented in this chart.

<p>X = X chromosome Y = Y chromosome B = allele for normal color vision b = allele for color blindness</p>
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Which of these could NOT be a biological child of parents having the genotypes  $X^B X^b$  and  $X^B Y$ ?

- A. Color-blind son
- B. Color-blind daughter
- C. Daughter with normal color vision
- D. Son with normal color vision

14. Which physiological system includes the lungs, trachea, and pharynx?

- F. Endocrine
- G. Nervous
- H. Reproductive
- J. Respiratory

15. Lupe performed an experiment to test the ability of different heavy metals to inhibit normal enzyme activity in liver.

Lupe placed 5 g of liver in each of 5 test tubes. In 4 of the tubes, she also placed equal amounts of a heavy metal. She then added 6 mL of hydrogen peroxide to all 5 tubes. She used the resulting bubble column as an indicator of enzyme activity in the liver and recorded the data in this table.

(Note: The greater the height of the bubble column, the greater the enzyme activity.)

	Height of bubble column (cm)			
	Trial #1	Trial #2	Trial #3	Average
Control (No heavy metal)	7	8	8	7.7
Lead (Pb)	4	4	5	4.3
Mercury (Hg)	4	6	5	5.0
Magnesium (Mg)	5	5	6	5.3
Zinc (Zn)	10	9	9	9.3

Based on Lupe's data, enzyme activity was inhibited the most by which of the 4 heavy metals?

- A. Zn
- B. Mg
- C. Hg
- D. Pb

16. Which of the following body systems produces hormones that are essential for the regulation of the human reproductive cycle?

- F. Circulatory
- G. Endocrine
- H. Immune
- J. Nervous

17. A scientist burned 100 g of rice until only 5 g of inorganic material remained. Approximate the percentage of inorganic material in the original 100 g rice sample.

- A. 0.05%
- B. 5%
- C. 20%
- D. 90%

18. A biologist hypothesizes that biological evolution is occurring in a certain population of freshwater fish she is studying. To support this hypothesis, the biologist would need to document a change in which of the following?
- F. Size of individual fish over their lifetime
  - G. Size of the population of fish over the course of her study
  - H. Frequency of alleles in the population over the course of her study
  - J. Frequency of predation on members of the population over the course of her study
19. An organelle found in a liver cell would best be identified as a lysosome if its primary function was which of the following?
- A. Processing and packaging of cellular materials prior to export
  - B. Harvesting of light energy to produce carbohydrates
  - C. Detoxification of poisonous molecules within the cell
  - D. Digestion of macromolecules and old organelles
20. The cytoplasm of red blood cells has a higher concentration of  $\text{Na}^+$  than does pure water. Suppose a biologist places a red blood cell in pure water. Is there a net flow of water molecules into or out of the red blood cell, and by which process does this net flow of water occur?
- F. Out of the cell; osmosis
  - G. Into the cell; osmosis
  - H. Out of the cell; active transport
  - J. Into the cell; active transport
21. The different steps in the synaptic transmission of an action potential from one neuron to another neuron are listed.
1. An action potential arrives at the synaptic terminal of the axon.
  2. Receptors on the dendrites bind to neurotransmitters.
  3. Neurotransmitters are released into the synaptic cleft.
  4. Synaptic vesicles containing neurotransmitters fuse with the plasma membrane of the synaptic terminals of the axon.
  5. An action potential travels from the neuron's cell body along the axon.
- In what order—from the start of the action potential in one neuron to the receipt of that action potential by another neuron—are these steps involved in this process?
- A. 5, 1, 4, 3, 2
  - B. 5, 1, 2, 3, 4
  - C. 5, 2, 3, 4, 1
  - D. 5, 2, 3, 1, 4

22. Morgan hypothesizes that the activity of amylase, an enzyme that catalyses the breakdown of starch, will be greater at 37°C than at 25°C. She prepares 2 tubes: Tube 1 and Tube 2. Morgan adds 2 g of starch and 1 mL of an enzyme suspension to Tube 1 and incubates it at 37°C for 20 min. To accurately test her hypothesis, Morgan should add 2 g of the starch and 1 mL of the enzyme suspension to Tube 2 and incubate it at \_\_\_\_\_ for \_\_\_\_\_.
- F. 25°C; 20 min
  - G. 37°C; 20 min
  - H. 25°C; 10 min
  - J. 37°C; 10 min
23. A homeowner applied a pesticide to a home infested with cockroaches. After 1 day she found many dead cockroaches. Several days later, she observed a few live cockroaches. The homeowner reapplied the pesticide, but she continued to see some live cockroaches. Which of the following is the most likely explanation for why some of the cockroaches were able to survive repeated exposure to the pesticide? Some of the cockroaches:
- A. experienced a mutation as a direct result of the first exposure that conferred resistance to the pesticide.
  - B. were able to alter their genotypes to ones that conferred resistance to the pesticide.
  - C. developed pesticide resistance through contact with other species of resistant insects.
  - D. had an allele that conferred resistance to the pesticide prior to their first exposure.
24. The manner in which chromosomes separate into gametes during meiosis is the molecular mechanism behind which of Mendel's laws, if either?
- F. Law of independent assortment only
  - G. Law of segregation only
  - H. Both the law of independent assortment and the law of segregation
  - J. Neither the law of independent assortment nor the law of segregation
25. Which of the following solutions has the greatest concentration of hydroxide ions (OH<sup>-</sup>)?
- A. Urine (pH 6.0)
  - B. Rainwater (pH 5.5)
  - C. Tomato juice (pH 4.0)
  - D. Gastric juice (pH 2.0)



26. Biology students carried out an experiment to determine if a certain fertilizer increased the height of plants. The students selected 4 types of plants and planted 10 seeds of each type. Five seeds of each type were treated with fertilizer and 5 seeds of each type were not treated with fertilizer. All other conditions were identical. The students recorded the plant height after 120 days, as shown in the table.

Plant Height (cm)							
Castor bean		Okra		Radish		Tomato	
Fertilizer	No fertilizer	Fertilizer	No fertilizer	Fertilizer	No fertilizer	Fertilizer	No fertilizer
150	145	75	70	15	10	150	140
145	140	80	80	20	15	145	130
155	150	75	70	25	20	155	135
160	155	75	65	20	15	160	120
140	140	75	70	20	20	165	125

Based on the results shown in this table, the difference (in cm) between the average height of the plants treated with fertilizer and the average height of the unfertilized plants was greatest for which of these plant types?

- F. Castor bean
  - G. Okra
  - H. Radish
  - J. Tomato
27. Thylakoid membranes within chloroplasts contain chlorophyll, which is used during the light-dependent reactions of photosynthesis. The light-independent reactions of photosynthesis occur in the stroma of the chloroplasts. Which of the following statements best describes how these 2 processes are related?
- A. The light-dependent reactions use ATP molecules formed during the light-independent reactions to convert  $\text{CO}_2$  into sugar molecules.
  - B. The light-dependent reactions use sugar molecules formed during the light-independent reactions to generate ATP molecules.
  - C. The light-independent reactions use ATP molecules formed during the light-dependent reactions to convert  $\text{CO}_2$  into sugar molecules.
  - D. The light-independent reactions use sugar molecules formed during the light-dependent reactions to generate ATP molecules.
28. Carbon-14 is a radioactive isotope used to determine the age of objects composed of organic matter. Carbon-12 and carbon-13 are other isotopes of carbon. The number of what subatomic particle must differ among these 3 carbon isotopes?
- F. Electron
  - G. Neutron
  - H. Photon
  - J. Proton

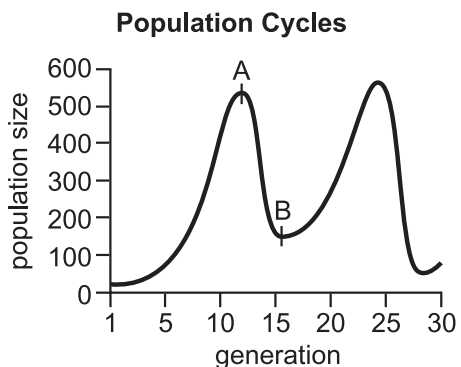
29. Assume that 10% of the energy absorbed by one trophic level is transferred to the next successive level and the same amount of energy is available at the primary producer level of each of these food chains.

Food Chain 1: phytoplankton → zooplankton → smelt → trout → humans

Food Chain 2: phytoplankton → smelt → humans

How much energy would be available to humans in Food Chain 2 as compared to the energy available to humans in Food Chain 1?

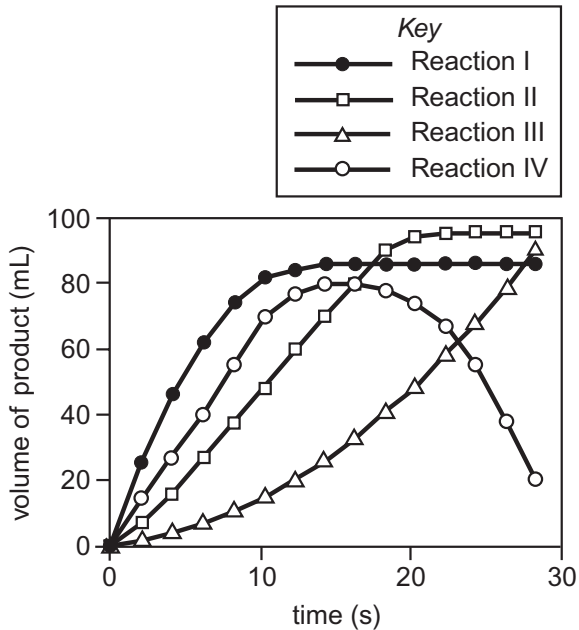
- A. 10 times less energy
  - B. 10 times more energy
  - C. 100 times less energy
  - D. 100 times more energy
30. Suppose that a *Brassica rapa* plant has 2 alleles for dark green leaf color and has dark green leaves. A second *B. rapa* plant has 1 allele for dark green leaf color and 1 allele for yellow-green leaf color and has dark green leaves. Based on this information, which term best describes the relationship between these 2 alleles, in terms of the resulting phenotype, assuming that the leaf color character is controlled by a single gene?
- F. The alleles for the gene coding for leaf color are sex-linked.
  - G. The alleles for the gene coding for leaf color are codominant.
  - H. The allele for dark green leaf color is dominant to the allele for yellow-green leaf color.
  - J. The allele for yellow-green leaf color is dominant to the allele for dark green leaf color.
31. A biologist recorded the number of rabbits in a population over 30 generations.



Which of the following statements best explains why the number of rabbits in the population dramatically decreased between Points A and B? Shortly after the 10th generation:

- A. a new predator that feeds solely on the rabbits' main competitor was introduced into the rabbits' habitat.
- B. area farmers set traps for coyotes, the rabbits' main predator.
- C. a change in environmental conditions led to a significant increase in the amount of food available to the rabbits.
- D. a fatal disease infected a large proportion of the rabbits in this population.

32. This graph shows the volume of product produced over time for 4 different enzyme-catalyzed reactions.



Between 0 s and 2 s, which of these 4 reactions has the greatest average rate of production?

- F. Reaction I
  - G. Reaction II
  - H. Reaction III
  - J. Reaction IV
33. A certain species of protist lives within the intestines of a termite. After the termite chews and swallows wood, the protist enzymatically digests the wood, providing a usable source of energy for both itself and the termite. The relationship between the protist and the termite is best described as:
- A. competitive.
  - B. mutualistic.
  - C. parasitic.
  - D. predatory.
34. A single mitotic division of a human skin cell generally produces:
- F. 2 cells, each with 1 complete diploid set of chromosomes.
  - G. 2 cells, each with 1 complete haploid set of chromosomes.
  - H. 4 cells, each with 1 complete diploid set of chromosomes.
  - J. 4 cells, each with 1 complete haploid set of chromosomes.

35. The presence of which of the following structures in a cell would indicate that the cell is NOT a photosynthetic bacterium?
- A. Cell wall
  - B. Chloroplast
  - C. DNA
  - D. Ribosome
36. When a new volcanic island forms, the pioneer species are the first species to successfully colonize the island. Which of the following characteristics would be the most advantageous to a pioneer species colonizing this newly formed island?
- F. Low dispersal rate
  - G. Narrow environmental tolerance
  - H. High reproductive rate
  - J. Long generation time
37. According to the theory of endosymbiosis, the ancestor of modern mitochondria is best described as which of the following?
- A. A virus that formed a symbiotic relationship with another virus
  - B. A virus that formed a symbiotic relationship with a cell
  - C. A prokaryote that formed a symbiotic relationship with another cell
  - D. A eukaryote that formed a symbiotic relationship with another cell
38. DNA molecules differ from RNA molecules in which of the following ways?
- I. DNA molecules contain a different type of pentose sugar than do RNA molecules.
  - II. DNA molecules contain the nitrogenous base cytosine while RNA molecules do not.
  - III. RNA molecules contain the nitrogenous base uracil while DNA molecules do not.
- F. I and II only
  - G. I and III only
  - H. II and III only
  - J. I, II, and III

# International Subject Test— Biology Practice Test

## Part 1 Answer Key

The following table contains the question number and the correct answer (Key) for each question in Part 1 of this pdf file.

1	A
2	D
3	A
4	D
5	A
6	A
7	D
8	C
9	A
10	B
11	C
12	C
13	B
14	D
15	D
16	B
17	B
18	C
19	D

20	B
21	A
22	A
23	D
24	C
25	A
26	D
27	C
28	B
29	D
30	C
31	D
32	A
33	B
34	A
35	B
36	C
37	C
38	B

# Biology

## Part 2

*45 Minutes—38 Questions*

For each question, choose the best answer and select the circle next to it. If you change your mind about an answer, choose a different answer and select the circle next to it.

Your score will be based only on the number of questions you answer correctly during the time allowed. You will **not** be penalized for guessing. **It is to your advantage to answer every question even if you must guess.**

If you finish before time ends, you should use the time remaining to reconsider questions you are uncertain about.

1. All members of which of the following groups require a host cell to reproduce?
  - A. Fungi
  - B. Bacteria
  - C. Protists
  - D. Viruses
  
2. The process that is most directly responsible for the majority of the ATP produced during aerobic respiration is which of the following?
  - F. Fermentation
  - G. Glycolysis
  - H. Krebs cycle
  - J. Electron transport
  
3. The mode of natural selection that favors extreme phenotypes rather than intermediate phenotypes is best described as:
  - A. directional selection.
  - B. disruptive selection.
  - C. random selection.
  - D. stabilizing selection.
  
4. An ecologist measured the change in the mass of decomposing plant material using the appropriate SI unit. The unit that the ecologist most likely used to measure the mass was:
  - F. day.
  - G. kilogram.
  - H. liter.
  - J. pound.

5. Consider this mRNA codon chart.

1st position	2nd position				3rd position
	U	C	A	G	
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	Stop	Stop	A
	Leu	Ser	Stop	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

Which of the following mRNA sequences codes for valine (Val), glutamic acid (Glu), and serine (Ser), respectively?

- A. UGG-AGG-CUA
- B. GUA-GGG-AGC
- C. GUC-GAA-ACU
- D. GUG-GAG-AGC

6. An individual with the genotype AaBb is crossed with an individual with the genotype AaBb. Assuming that these 2 genes are unlinked, what is the percent chance that their offspring will have the genotype AaBb?

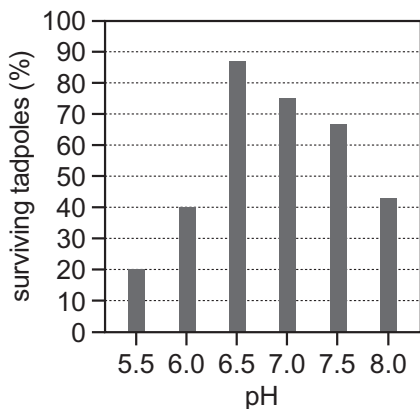
- F. 50%
- G. 25%
- H. 12.5%
- J. 6.25%



7. Which of the following best describes the level of biological organization that includes assemblages of different groups of species living within a defined area?
- A. Organism
  - B. Population
  - C. Community
  - D. Family
8. For biological evolution to occur by way of natural selection, the trait being selected for need NOT:
- F. be heritable.
  - G. vary among individuals.
  - H. increase an individual's life span.
  - J. increase an individual's reproductive success.
9. Two students conduct an experiment in which they measure the concentration of an enzyme in a test tube at 1 minute intervals over the course of a chemical reaction. Before beginning the experiment, each of the students makes a prediction about what will happen to the enzyme concentration as the reaction progresses.
- Student 1 predicts that the concentration of the enzyme in the test tube will significantly decrease as the reaction progresses.
- Student 2 predicts that the concentration of the enzyme in the test tube will not significantly decrease as the reaction progresses.
- The results of the experiment will most likely support the prediction of which student?
- A. Student 1; enzymes are consumed during a chemical reaction.
  - B. Student 1; enzymes are not consumed during a chemical reaction.
  - C. Student 2; enzymes are consumed during a chemical reaction.
  - D. Student 2; enzymes are not consumed during a chemical reaction.
10. During metaphase I of meiosis, which of the following occurs?
- F. Centrosomes of replicated chromosomes line up along the cell's equator.
  - G. Sister chromatids separate and move toward opposite poles of the cell.
  - H. Paired homologous chromosomes line up along the cell's equator.
  - J. Homologous chromosomes separate and move toward opposite poles of the cell.

11. Ethan wants to determine whether temperature affects the rate at which mold grows on bread. He puts one piece of bread inside a petri dish, closes the lid, and places the petri dish in the refrigerator. To determine whether temperature affects the growth of mold, Ethan should place another piece of bread into a petri dish:
- A. leave the dish uncovered, and place the dish in the refrigerator.
  - B. cover the dish, and place the dish in the refrigerator.
  - C. leave the dish uncovered, and place the dish in a dark, room temperature cabinet.
  - D. cover the dish, and place the dish in a dark, room temperature cabinet.
12. Two scientists, Stanley Miller and Harold Urey, conducted an experiment in which they attempted to re-create conditions comparable to those hypothesized to have existed on early Earth. Which of the following conclusions did they draw based on the results of this experiment?
- F. Spontaneous generation could not occur.
  - G. Earth's early atmosphere contained oxygen gas.
  - H. Organic molecules could form from inorganic substances.
  - J. Many simple organisms could form from Earth's early atmosphere.
13. Which of these cellular structures are found in certain cells of an oak leaf but NOT in the skin cells of a black bear?
- I. Cell wall
  - II. Chloroplast
  - III. Nucleus
- A. I and II only
  - B. I and III only
  - C. II and III only
  - D. I, II, and III
14. Suppose Condition A is an autosomal recessive trait that affects the nervous system. In one family, the father, mother, daughter, and elder son do not have Condition A, but the younger son has Condition A. Both of the individuals in which of the following pairs MUST be carriers of the Condition A allele?
- F. Father and elder son
  - G. Mother and daughter
  - H. Daughter and elder son
  - J. Mother and father

15. After Tyler adds a chemical to normally functioning cells, proteins begin to accumulate in the cells' endoplasmic reticula. This chemical most likely prevents movement of proteins from the endoplasmic reticulum to which organelle?
- Golgi apparatus
  - Lysosome
  - Mitochondrion
  - Ribosome
16. A paramecium lives in a relatively hypotonic environment. Which of these structures does the paramecium use to maintain homeostasis under these conditions, and how does it do so?
- Contractile vacuole; by expelling water from the intracellular space into the extracellular space
  - Contractile vacuole; by absorbing water from the extracellular space into the intracellular space
  - Lysosome; by expelling water from the intracellular space into the extracellular space
  - Lysosome; by absorbing water from the extracellular space into the intracellular space
17. A biologist conducted an experiment to determine whether the survival of tadpoles was affected by the pH of the pond water in which they live. His results are shown in this graph.



Based on this graph, the difference between the percentage of surviving tadpoles is greatest for which 2 consecutive pH values?

- 5.5 and 6.0
- 6.0 and 6.5
- 6.5 and 7.0
- 7.5 and 8.0

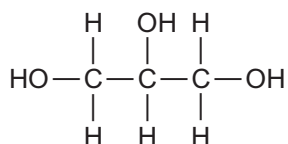
18. Suppose a population of land-dwelling snakes is split into 2 separate populations when a river changes course, cutting right down the middle of their habitat and preventing them from interbreeding. What type of isolating mechanism is described in this scenario?

- F. Temporal isolation
- G. Geographic isolation
- H. Behavioral isolation
- J. Habitat isolation

19. What is the primary function of most epithelial tissues?

- A. Contracting under voluntary control
- B. Joining bones and muscles together
- C. Lining internal or external surfaces of the body
- D. Conducting electrochemical signals

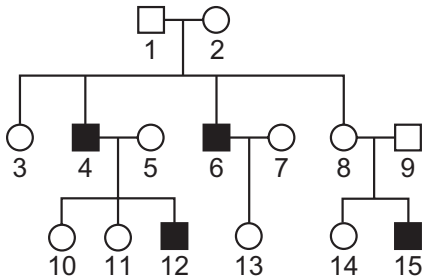
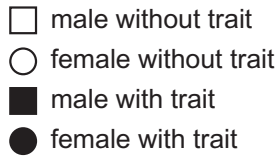
20. In glycerol ( $C_3H_8O_3$ ), there is a hydroxyl group (OH) bound to each of the 3 carbon atoms.



The bond between the oxygen atom of a hydroxyl group and a carbon atom in glycerol is best classified as what type of bond?

- F. Covalent
  - G. Hydrogen
  - H. Intermolecular
  - J. Ionic
21. Ming volunteers for a study to determine whether a certain medication helps people sleep. Volunteers are assigned to 1 of 2 groups. Volunteers in Group 1 are given the medication, and volunteers in Group 2 are given a placebo. Which of the following steps is necessary to ensure the scientific validity of the results?
- A. Assigning the subjects to each group at random
  - B. Assigning all of the subjects with sleeping problems to the placebo group
  - C. Telling subjects if they are receiving the medicine or the placebo
  - D. Placing 100 volunteers in Group 1 and 10 volunteers in Group 2

22. This pedigree shows 3 generations of a family in which some members exhibit a particular X-linked recessive trait.



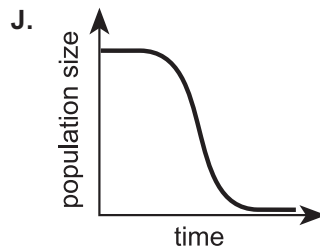
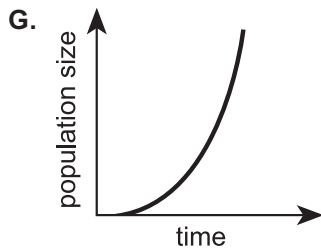
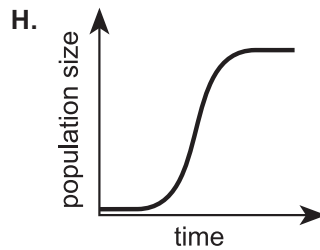
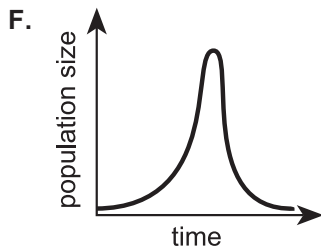
The 2 females in which of the following pairs must have the same genotype?

- F.** 3 and 5  
**G.** 7 and 11  
**H.** 8 and 13  
**J.** 10 and 14
23. Which of the following is most likely an example of an innate behavior?
- A.** A monkey washing its food in a stream after watching another monkey do the same  
**B.** A young coyote avoiding porcupines after the porcupine sticks the coyote with its quills  
**C.** A sea turtle hatchling orienting itself toward the ocean upon emerging from its underground nest  
**D.** A chimpanzee stacking boxes to reach bananas hanging from the ceiling of its enclosure
24. Papain, an enzyme in papaya, breaks down polymers composed of amino acids. Which of the following substances does papain break down?
- F.** Carbohydrates  
**G.** Fatty acids  
**H.** Nucleic acids  
**J.** Proteins

25. In biology class, Keesha places a suspension of the green algae *Chlorella* in a growth chamber. She turns the light on in the growth chamber, then measures the change in the amount of CO<sub>2</sub> in the growth chamber over the next 15 minutes. She then repeats the experiment, using a growth chamber that is devoid of light. She finds that the amount of CO<sub>2</sub> in the lighted growth chamber decreases over time, while the amount of CO<sub>2</sub> in the dark growth chamber increases over time. The most likely explanation for her results is that, in the absence of light, CO<sub>2</sub>:

- A. consumption by photosynthesis is greater than CO<sub>2</sub> production by cellular respiration.
- B. consumption by cellular respiration is greater than CO<sub>2</sub> production by photosynthesis.
- C. production by photosynthesis is greater than CO<sub>2</sub> consumption by cellular respiration.
- D. production by cellular respiration is greater than CO<sub>2</sub> consumption by photosynthesis.

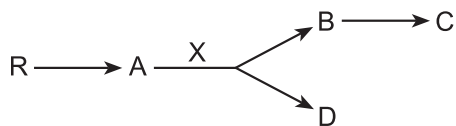
26. For years, runoff from a nearby industrial plant has entered a certain lake. The runoff causes seasonal blooms of algae in the lake. These algae are short-lived and die off quickly. Which of the following graphs most likely illustrates the growth pattern of this algal population from the beginning of the spring seasonal bloom to the end of the resultant die-off of the algal population?



27. Based on their scientific names, which of the following conclusions about the classification of *Bradypus torquatus* and *Bradypus variegatus* is most likely correct? The 2 organisms belong to:

- A. the same species.
- B. the same genus.
- C. different phylums.
- D. different kingdoms.

28. In this series of metabolic reactions, Compound R is converted into Compound A, and Enzyme X then catalyzes the conversion of Compound A into Compounds B and D. Compound B is converted to Compound C.



Assume that Compound C inhibits Enzyme X and that Compound C is not consumed in a subsequent reaction. As the concentration of Compound C increases, the rate of production of which compound is LEAST likely to decrease?

- F. A
  - G. B
  - H. C
  - J. D
29. Which of the following statements best describes how, in trees, water moves from the roots to the leaves?
- A. Transpiration from the leaves pulls water upward.
  - B. Gravity continually pulls water and nutrients upward.
  - C. Xylem contracts and pushes water and nutrients upward.
  - D. Trees use energy from ATP to push water and nutrients upward.
30. The pancreas produces which of the following hormones?
- F. Insulin and glucagon
  - G. Oxytocin and prolactin
  - H. Estrogen and progesterone
  - J. Epinephrine and norepinephrine

31. Gavin measured the length of each of 5 oyster shells and recorded the data in this table.

Oyster shell	Shell length (cm)
1	4.1
2	5.8
3	5.2
4	4.0
5	6.9

What is the mean shell length for these 5 oyster shells?

- A. 4.0 cm
  - B. 5.0 cm
  - C. 5.2 cm
  - D. 6.9 cm
32. Which of the following characteristics do organisms in the class Mammalia and the class Aves have in common?
- F. Spinal cord protected by a vertebral column
  - G. Lightweight hollow bones
  - H. Specialized teeth adapted to a specific diet
  - J. Diaphragm separating the thoracic and abdominal cavities
33. Marco grows algae in the presence of a substance that stops the light-independent reactions of photosynthesis. As a result, which molecules will the light-dependent reactions eventually stop producing?
- A. ADP and NADP<sup>+</sup>
  - B. ADP and NADPH
  - C. ATP and NADP<sup>+</sup>
  - D. ATP and NADPH
34. During what phase of mitosis do sister chromatids attached at the centromere first separate from one another as they begin to move toward the cell poles?
- F. Anaphase
  - G. Metaphase
  - H. Prophase
  - J. Telophase



35. Consider the following simple lake food chain.  
Algae → Mosquito larvae → Dragonfly larvae → Perch → Pike  
According to this diagram, which of these organisms is a tertiary consumer?
- A. Pike
  - B. Perch
  - C. Dragonfly larvae
  - D. Mosquito larvae
36. In what kingdom would scientists most likely classify a multicellular, nonmotile, autotrophic organism with a cell wall containing cellulose?
- F. Animalia
  - G. Fungi
  - H. Plantae
  - J. Protista
37. Methane ( $\text{CH}_4$ ), oxygen ( $\text{O}_2$ ), and nitrogen ( $\text{N}_2$ ) are gases at room temperature. Water ( $\text{H}_2\text{O}$ ) has a similar molar mass to these molecules. Why is  $\text{H}_2\text{O}$  a liquid at room temperature while  $\text{CH}_4$ ,  $\text{O}_2$ , and  $\text{N}_2$  are not?
- A.  $\text{H}_2\text{O}$  has a lower viscosity.
  - B.  $\text{H}_2\text{O}$  has a lower boiling point.
  - C. Adjacent  $\text{H}_2\text{O}$  molecules form hydrogen bonds.
  - D. Nonpolar covalent bonds hold  $\text{H}_2\text{O}$  molecules together.
38. Collectively, all the biotic and abiotic components in a particular area are best described as which of the following?
- F. Community
  - G. Ecosystem
  - H. Niche
  - J. Population

# International Subject Test— Biology Practice Test

## Part 2 Answer Key

The following table contains the question number and the correct answer (Key) for each question in Part 2 of this pdf file.

1	D
2	D
3	B
4	B
5	C
6	B
7	C
8	C
9	D
10	C
11	D
12	C
13	A
14	D
15	A
16	A
17	B
18	B
19	C

20	A
21	A
22	C
23	C
24	D
25	D
26	A
27	B
28	A
29	A
30	A
31	C
32	A
33	D
34	A
35	B
36	C
37	C
38	B