SECTION 4

TEST II SAMPLE QUESTIONS

This section of the Georgia Assessments for the Certification of Educators® (GACE™) Preparation Guide provides sample selected-response questions with an annotated answer key for you to review as part of your preparation for the test. The sample selected-response questions are designed to illustrate the nature of the test questions. Work through the questions carefully before referring to the annotated answer key, which follows the sample selected-response questions. The answer key provides the correct response to each question, describes why each correct response is the best answer, and lists the objective within the test framework to which each question is linked.

QUESTIONS

1. In the prokaryotic life cycle, the process of conjugation is:

   A. a form of genetic transfer between two cells.

   B. the mechanism used by single-celled organisms to grow.

   C. a way for two prokaryotes to combine their gametes.

   D. the biochemical pathway employed in spore formation.

2. In a mammal, which of the following physiological conditions would most likely cause a decrease in the amount of water reabsorbed by the kidneys?

   A. dehydration

   B. decreased respiratory rate

   C. increased blood pressure

   D. low blood pH

3. The feeding strategy of substrate feeders involves:

   A. using complex mouth parts to break food into smaller pieces.

   B. drawing bodily fluids from a host organism through a proboscis.

   C. filtering suspended particles directly from water or air.

   D. digesting organic matter as they tunnel through it.

4. The pancreas plays an important role in regulating the concentration of glucose present in human blood. When blood glucose levels drop following exercise, pancreatic cells respond by:

   A. releasing insulin, which stimulates the uptake of glucose into cells.

   B. producing amylase to promote carbohydrate digestion in the small intestine.

   C. secreting glucagon, which stimulates glycogen catabolism in the liver.

   D. converting fatty acids from digested food into glucose.

5. To characterize the ecological niche of an organism, it is most important for a biologist to determine the organism's:

   A. geographic range and migratory pattern.

   B. habitat and role within the community of which it is a part.

   C. breeding cycle and typical number of offspring.

   D. physiological and behavioral adaptations to the climate in which it lives.

6. Which of the following statements best accounts for the relatively low levels of nutrients such as phosphorus and nitrogen that are found in the soil of healthy tropical rain forests?

   A. Heavy rainfall throughout the year leaches the nutrients from the soil and into bodies of water where they precipitate.

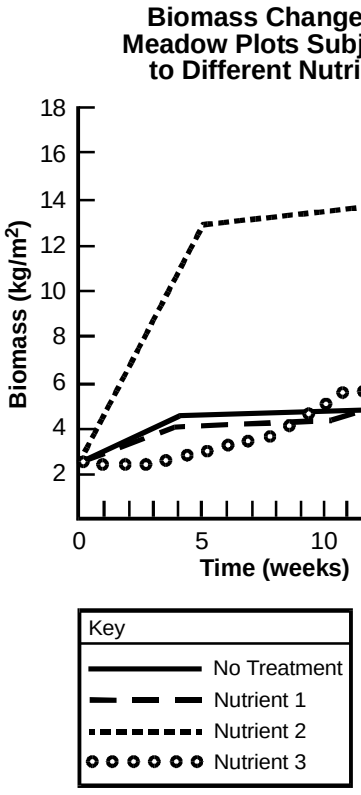
   B. The high temperatures increase the volatility of the nutrients and allow them to evaporate readily into the atmosphere.

   C. The composition of the soil causes the nutrients to react with other elements and form compounds that are unusable to plants and animals.

   D. Plants take up the nutrients almost as soon as they become available through the decomposition of organic matter.

7. **Use the information below to answer the question that follows.**

   An experiment is conducted in which different nutrients are added to plots of a meadow ecosystem and the changes in biomass are monitored for several weeks. One plot receives no treatment. The changes in biomass for the different treatments are shown in the graph below.



   Which of the following conclusions can be drawn from these data?

   A. This ecosystem is very stable under normal conditions.

   B. Most of this ecosystem's biomass can be attributed to a single species.

   C. Nutrients 1 and 3 are nonessential to this ecosystem.

   D. Nutrient 2 is a limiting factor in this ecosystem under normal conditions.

8. Which of the following questions about genetically modified food crops would most appropriately be addressed through scientific inquiry?

   A. Are genetically modified foods safe for human consumption?

   B. What effect will cultivation of genetically modified crops have on the family farm?

   C. Is it ethical to combine genes from different species?

   D. What factors will make genetically modified foods acceptable to consumers?

9. A prepared slide has been placed on the stage of a light microscope. Which of the following steps should be taken next when preparing to view the specimen?

   A. Choose the objective lens that is preferred and use the coarse-focus knob to lower the objective lens until the specimen on the slide comes into focus.

   B. Select the objective lens with the greatest magnification and, while looking into the eyepiece, adjust the coarse-focus knob until the specimen on the slide is visible.

   C. Choose the objective lens that is best for the particular specimen that is being viewed and then slowly turn the fine-focus knob to lower the lens until it just touches the slide.

   D. Select the objective lens with the lowest magnification and, while watching from the side, lower the lens with the coarse-focus knob to a point just above the slide.

10. Precision and accuracy are both concepts related to measurement in science. In contrast to precision, accuracy is:

    A. affected by systematic errors, such as a malfunctioning balance.

    B. based on consistency among individual measurements.

    C. based on the number of significant figures recorded.

    D. determined by measures of central tendency, such as the mean, of data.

ANNOTATED ANSWER KEY

For question	The correct response is	Reason	Test Objective
1	A	Prokaryotic cells divide by binary fission, which produces daughter cells that are genetically identical to the parent cell. However, there are several mechanisms that generate genetic diversity in prokaryote populations. One such mechanism is conjugation, which is the direct transfer of genetic material between two prokaryotic cells that are temporarily joined by a cytoplasmic bridge.	0009
2	C	In addition to filtering and removing nitrogenous wastes from the blood, the kidneys also serve an important osmoregulatory function in the control of blood volume. Since blood volume directly affects blood pressure, the kidneys of a mammal with high blood pressure will tend to excrete more water.	0010
3	D	Substrate-feeders are defined as organisms that live on, or in, their food source (e.g., earthworms, leaf miners, larvae of wood-boring beetles). In these organisms, the organic substrate itself, or organic material found in the substrate, is the food. By tunneling through the substrate, these organisms ingest the organic material that is their food source.	0011
4	C	Scattered throughout the pancreas are clusters of endocrine cells called the islets of Langerhans. These cells contain glucose receptors that monitor the concentration of glucose in the blood. Islet cells secrete two antagonistic hormones, glucagon and insulin. When blood glucose levels are elevated, insulin is released, which slows down the hydrolysis of glycogen in the liver, reducing the production of glucose. When blood glucose levels drop, glucagon is released and stimulates the breakdown of glycogen in the liver.	0012
5	B	The ecological niche of an organism is generally defined as the sum total of the organism's utilization of biotic and abiotic resources in its environment. A description of these resources requires identifying the habitat in which the organism lives, as well as describing the organism's relationships with other species (e.g., predators, prey, food resources, competitors) in the biotic community with which it interacts.	0013

For question	The correct response is	Reason	Test Objective
6	D	Tropical rain forests are characterized by luxuriant growth of vegetation, but this vegetation is often supported by soils that are thin and relatively nutrient poor. Nutrients, such as nitrogen and phosphorus, are locked up in the large standing biomass of trees and other plants in these forests. When trees die in temperate forests, decomposition proceeds slowly and nutrients remain in the decomposing organic matter on the forest floor before reentering the nutrient cycle. However, due to high temperatures and abundant moisture, decomposition of organic matter proceeds rapidly in tropical rain forests, and nutrients are quickly recycled into the production of new vegetation.	0014
7	D	The biomass produced in an ecosystem is dependent on the amount of critical resources that are available to the primary producers in the ecosystem. In the meadow ecosystem depicted in the graph, there is a critical nutrient that is a limiting factor in biomass production. Fertilization of the meadow with this nutrient resulted in a significantly increased biomass production because it was a critical nutrient that was in limited supply. From this information, the conclusion can be drawn that a deficiency of nutrient 2 was the primary factor limiting biomass production for the primary producers in this ecosystem.	0015
8	A	Scientific inquiries are based on the formulation of testable hypotheses. Scientifically valid experiments that are ethical can be devised to test whether or not genetically modified foods are safe for human consumption.	0016
9	D	After a slide has been placed on the stage of a light microscope, the next step is to lower the lowest magnification objective lens to its lowest point above the slide. This should be done while watching from the side of the microscope. Then, while looking through the ocular lens, the objective lens should be raised until the specimen is brought into focus. By focusing upward from the slide, damage to the slide can be avoided.	0017
10	A	The precision of a measurement in science is defined as the degree of refinement of a measurement. For example, using an extremely sensitive electronic balance to measure the mass of an object will provide a more precise approximation to the object's true mass than using a pan balance. The accuracy of a measurement is the extent to which a measurement conforms to a known standard or value. Thus, accuracy refers to the presence or absence of errors in taking a measurement, and an accurate measurement is one that does not exhibit systematic errors such as those that might be introduced by a malfunctioning balance.	0018