

Name _____

Date Due _____

Regents Review Assignment #5-A09

Living Environment: Comet 2010-2011

Part A Questions

_____ 1. Which structures carry out life functions within cells?

- (1) tissues (3) organelles
(2) organ systems (4) organs

_____ 2. The sorting and recombining of genes during meiosis and fertilization usually leads to the production of

- (1) gametes with many copies of the same chromosome
(2) embryos with traits identical to those of all other members of the species
(3) zygotes with the genetic information to produce only females
(4) offspring with some traits that did not appear in their parents

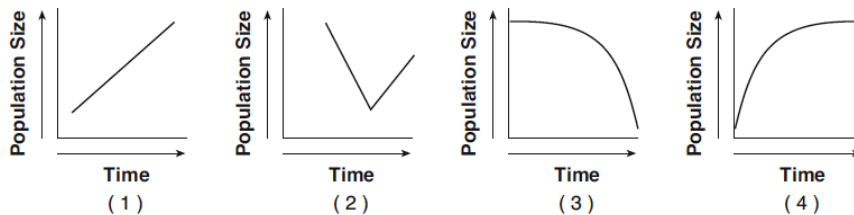
_____ 3. Which statement best describes the relationship between the blood of a human fetus and the blood of the mother?

- (1) Their blood systems are separate only at certain times in development and connected at other times.
(2) The blood flows directly from the mother into the fetus.
(3) Their blood systems are separate and no materials are exchanged.
(4) Their blood systems are separate, but certain materials pass from one to the other.

_____ 4. The ability of the human body to keep blood sugar levels within a fairly narrow range, despite the intake of meals high in carbohydrates, is an example of

- (1) active transport (3) homeostasis
(2) genetic recombination (4) digestion

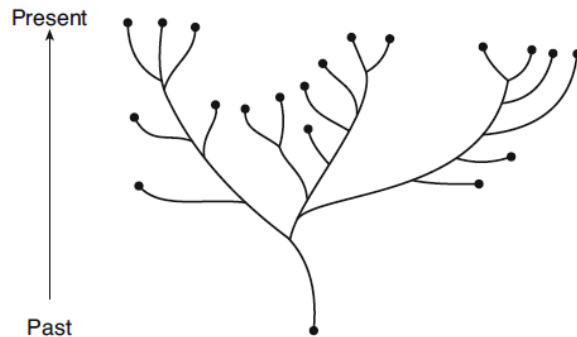
_____ 5. Which graph represents a population that grew and is maintained at the carrying capacity of its ecosystem?



6. An evolutionary pathway is represented shown at the right.

Which statement about evolutionary pathways is most accurate?

- (1) All evolutionary pathways show that life began with autotrophic organisms that soon evolved into heterotrophic organisms.
(2) Two organisms on the same branch of an evolutionary pathway are more closely related to each other than to those on distant branches.
(3) All the organisms shown at the ends of evolutionary pathway branch tips are alive today.
(4) Evolutionary pathways show that evolution is a short-term process.

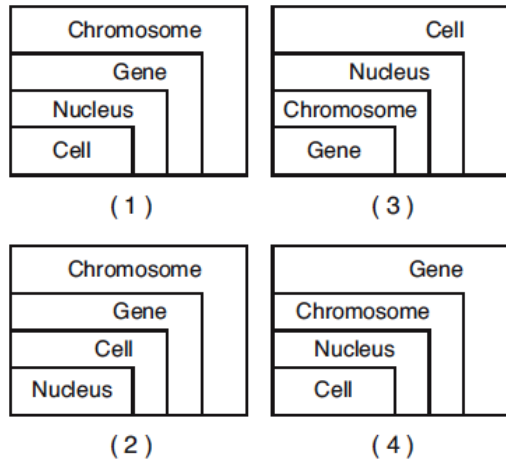


Part B-1 Questions

_____7. A laboratory procedure calls for heating 50 milliliters of a sugar solution to 60°C. Which piece of laboratory equipment will *not* be needed?

- (1) protective eyewear
- (2) ruler
- (3) thermometer
- (4) graduated cylinder

_____8. Which model best represents the relationship between a cell, a nucleus, a gene, and a chromosome?



_____9. A researcher recently discovered a new species of bacteria in the body of a tubeworm living near a hydrothermal vent. He compared the DNA of this new bacterial species to the DNA of four other species of bacteria. The DNA sequences came from the same part of the bacterial chromosome of all four species.

Species	DNA Sequence
unknown species	ACT GCA CCC
species I	ACA GCA CCG
species II	ACT GCT GGA
species III	ACA GCA GGG
species IV	ACT GCA CCG

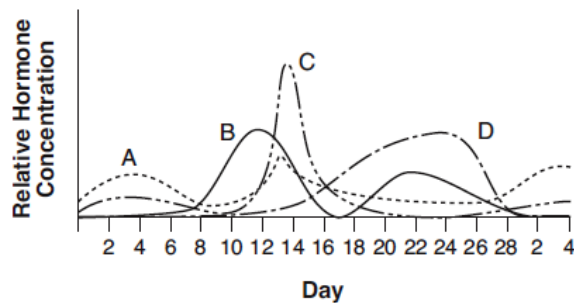
According to these data, the unknown bacterial species is most closely related to

- (1) species I
- (2) species II
- (3) species III
- (4) species IV

_____10. The graph below shows the relative concentrations of certain hormones in the blood during the human female reproductive cycle.

Which hormone has the lowest concentration on which day?

- (1) hormone A on day 4
- (2) hormone B on day 2
- (3) hormone C on day 12
- (4) hormone D on day 20



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Part B-2 Questions

Base your answers to questions 11 through 14 on the information below and on your knowledge of biology.

Hydrogen peroxide is a toxic substance produced in an organism as a result of certain metabolic processes. Catalase, a biological catalyst produced by cells, speeds the breakdown of hydrogen peroxide into less harmful substances. In an investigation, 2-gram pieces of liver (which contains catalase) were added to separate dishes. Each dish contained the same amount of a 3% solution of hydrogen peroxide, but at different temperatures. The relative activity of the catalase was determined. The results were recorded and are shown in the data table below.

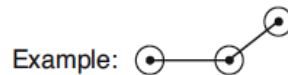
The Effect of Temperature on Catalase Activity

Temperature (°C)	Relative Catalase Activity
20	17
25	22
30	33
35	43
40	37
45	24
50	12

Directions (11-14): Using the information in the data table, construct a line graph on the grid on the next page, following the directions below.

11. Mark an appropriate scale on each axis. [1]

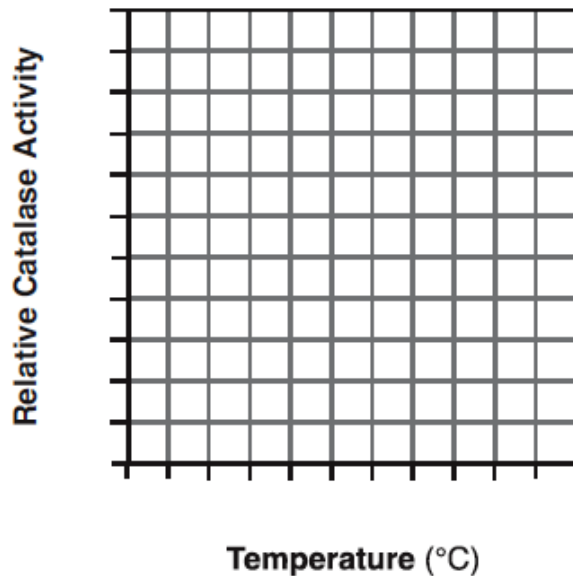
12. Plot the data, surround each point with a small circle, and connect the points. [1]



13. At which temperature does catalase work most effectively? Support your answer. [1]

14. What type of substance is catalase? [1]

The Effect of Temperature on Catalase Activity



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Part C Questions

Base your answers to questions 15 through 17 on the information below and on your knowledge of biology.

“A park with a small lake is home to a population of ducks. The building of a housing complex eliminates a nearby pond. Soon other ducks and waterbirds like geese and egrets come to live at this small lake.”

15. State *one* specific way the new populations of birds may affect the original population of ducks. [1]

16. State *one* specific way the new populations of birds may change the abiotic factors of the environment in and around the lake. [1]

17. Predict *one* way the new populations of birds may affect the populations of plants that live in and around the lake. [1]

18. A population of bats feeds on flying insects. Some of these bats have a gene that results in much stronger flight muscles than those of the other bats in the area. Explain how this variation could lead to evolutionary change within this species of bat. In your answer, be sure to include an explanation of:

- competition within the bat population [1]
- survival of various individuals within the bat population [1]
- how the frequency of the trait for stronger flight muscles would be expected to change within the bat population over time [1]

19. Identify *one* activity of a mother that can disrupt fetal development and explain how this activity might affect the development of her fetus. [1]

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Part D Questions

Base your answers to questions 20 through 22 on the information below and on your knowledge of biology.

“A scientist conducted an experiment to test the hypothesis that maple seeds exposed to acid rain will take longer to germinate than seeds exposed to normal rain, which has a pH of 5.6. The scientist set up four groups, each containing 200 maple seeds. The water used for each group had a different pH value: 5.6, 4.0, 3.0, and 2.0. All other conditions were kept the same. After ten days, the number of seeds that had germinated in each group was counted.”

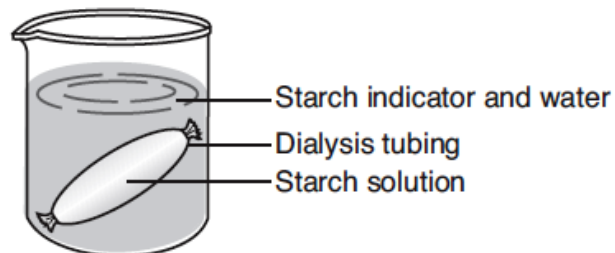
20. Identify the control group in this experiment. [1]

21. Identify the dependent variable in this experiment. [1]

22. State *one* example of experimental results that would indicate that acid rain, which has a pH between 4.5 and 4.0, could be responsible for a *decrease* in the number of young maple trees in some forest regions. [1]

Base your answers to questions 23 and 24 on the information and diagram below and on your knowledge of biology.

Starch turns blue black in the presence of a starch indicator. Dialysis tubing tied at both ends and containing starch solution is placed in a beaker of water. Yellowish brown starch indicator is then added to the water.



_____ 23. What will the solutions in the beaker and the tubing look like after 20 minutes?

- (1) The indicator solution in the beaker will be blue black and the starch solution in the tubing will not change color.
- (2) The starch solution in the tubing will be blue black and the indicator solution in the beaker will not change color.
- (3) Neither the indicator solution nor the starch solution will be blue black.
- (4) Both the indicator solution and the starch solution will be blue black.

_____ 24. This laboratory setup would most likely be used to demonstrate the process of

- (1) diffusion
- (2) active transport
- (3) replication
- (4) cellular respiration

25. Describe what will happen to red onion cells in a wet-mount slide when a saltwater solution is added to them. [1]
