<table>
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<th>PAGE</th>
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<td>June 2015</td>
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STUDENTS

To be successful on the Living Environment Regents you must be able to apply the concepts you have learned over the year. The exams and answers presented here provide you with about 300 questions that will test your understanding and your ability to apply your knowledge of biology. It is not enough to just do the practice exams before the Regents, you must be committed to seriously reviewing each answer and explanation until you feel confident of the concept.

Planning for the Regents begins perhaps a month or two months before the exam date. You do not want to wait until the last minute and cram. You should work a set of questions daily (about 15 to 20), going over the answers and reviewing the concepts involved. Star the questions you do not feel totally confident in and go back to those for more review and make notes in your margins.

If you work hard and do the exams carefully, review the answers and revisit areas of concern in a timely fashion, you should have success on the Regents.

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June 2015
Part A

Answer all questions in this part. [30]

Directions (1–30): For each statement or question, write in the space provided the number of the word or expression that, of those given, best completes the statement or answers the question.

1. Materials are transported within a single-celled organism by the
   (1) nucleus    (2) cytoplasm    (3) mitochondrion    (4) ribosome 1_____

2. Which row in the chart correctly pairs a food molecule with its building block?

<table>
<thead>
<tr>
<th>Row</th>
<th>Food Molecule</th>
<th>Building Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>starch</td>
<td>amino acid</td>
</tr>
<tr>
<td>(2)</td>
<td>sugar</td>
<td>starch</td>
</tr>
<tr>
<td>(3)</td>
<td>protein</td>
<td>amino acid</td>
</tr>
<tr>
<td>(4)</td>
<td>amino acid</td>
<td>sugar</td>
</tr>
</tbody>
</table>

2_____

3. The flow of energy in an ecosystem is best described as energy moving in
   (1) one direction from the Sun to the producers and then to the consumers
   (2) one direction from a consumer to a producer and then to the Sun as heat and light
   (3) two directions between the producers that are present
   (4) two directions, back and forth, between the producers and the consumers 3_____

4. Occasionally, during pregnancy, the placenta can separate from the uterus. This causes a disruption in development and sometimes death of the fetus. Harm to the developing fetus might occur because the placenta
   (1) transfers oxygen and nutrients to the fetal blood
   (2) sends maternal blood into the fetus
   (3) supplies milk for the fetus
   (4) breaks down wastes of the fetus 4_____

5. Which process produces only identical offspring?
   (1) meiotic cell division    (3) cloning
   (2) selective breeding    (4) fertilization 5_____

6. A photograph of human cells as seen with a compound light microscope is shown. A cell structure is labeled A. Structure A is most likely a
   (1) mitochondrion that synthesizes food for the cell
   (2) nucleus that is the site of food storage
   (3) mitochondrion that absorbs energy from the Sun
   (4) nucleus that is responsible for the storage of information 6_____

   A

Living Environment
7. A land-dwelling organism, \( A \), and an aquatic single-celled organism, \( B \), are represented to the right. Which statement best explains how \( A \) and \( B \) are able to survive in their environments?
(1) The organelles in \( B \) perform similar functions to the organ systems in \( A \).
(2) The transport system in \( B \) is more complex than the transport system in \( A \).
(3) Both \( A \) and \( B \) take in oxygen from the water.
(4) Only \( A \) can pass on traits to offspring.

8. A man is exposed to large amounts of ultraviolet radiation while sunbathing at the beach. This exposure causes a genetic change in the DNA of a skin cell. In the future, this change can be passed on to
(1) his male and female children
(2) his male children, only
(3) all cells in his body
(4) his skin cells, only

9. Palm oil, produced from palm trees, is not only a biofuel, but is also used in food additives, cosmetics, and lubricants. Palm tree plantations are now cultivated in areas that were formerly natural forests. One ecological concern raised by this expansion is that
(1) the natural forest ecosystem may harm the palm trees
(2) the use of the land for agriculture will increase the biodiversity of the area
(3) humans are changing the basic processes of the palm trees
(4) planting large expanses of one crop reduces the biodiversity of the area

10. Fishermen have harvested certain fish to the point where the population of that fish is decreasing. This level of direct harvesting could cause
(1) ecosystems to be improved for future generations
(2) ecosystems to be severely damaged
(3) the restoration of environmental stability
(4) all other fish species to increase in number

11. Which phrase best describes a gene?
(1) a segment of a DNA molecule found only in the body cells of an organism
(2) a segment of a DNA molecule found only in the gametes of an organism
(3) a segment of a DNA molecule that contains the instructions for producing a trait in an organism
(4) a segment of a DNA molecule that contains the instructions for producing all the characteristics of an organism
12. The molecule DNA contains the four bases listed below.
   A – adenine     G – guanine
   C – cytosine    T – thymine
Which base pairings normally occur during DNA replication?
(1) Guanine pairs with cytosine. Thymine pairs with thymine.
(2) Adenine pairs with thymine. Cytosine pairs with guanine.
(3) Thymine pairs with guanine. Cytosine pairs with adenine.
(4) Cytosine pairs with cytosine. Thymine pairs with thymine.

13. Evolution of a species could occur as a result of changes in the
(1) DNA in muscle cells
(2) base sequences in liver cells
(3) genes in an egg cell
(4) number of chromosomes in a fetal bone cell

14. One positive impact that industrialization has had is that
(1) industrialization produces waste gases that pollute the air
(2) fossil fuels used by industries help reduce finite resources
(3) industrialization has been a source of many jobs for people
(4) new technologies have increased acid rain

15. When receiving x rays, individuals wear a lead shield over major organs in
order to limit the body’s exposure to radiation. One reason for this procedure is to
(1) protect the patient against broken bones
(2) prevent mutations in gametes
(3) improve circulation in the patient
(4) increase the chance of a change in DNA

16. When an ant in a colony dies, the live ants will throw the dead ant out of the anthill. If a live ant from the colony, ant X, is sprayed with a
chemical characteristic of dead ants, the live ants will repeatedly throw this ant out of the anthill until they can no longer detect the chemical on ant X. What is the best explanation for this behavior?
(1) The ants are responding to a chromosomal mutation in ant X.
(2) The chemical is exhibiting a feedback mechanism.
(3) The live ants must continue this behavior until they have eliminated ant X.
(4) The chemical acts as a stimulus for a particular behavior.

17. Rabbits produce large numbers of offspring during each reproductive season, yet the number of rabbits within a given population changes very little from year to year. The stability of the population size is most likely the result of
(1) the development of mutations in young rabbits
(2) environmental factors that keep the population in check
(3) rabbits continuing to reproduce when the population is large
(4) the survival of more female rabbits than male rabbits
18. Genetic engineering has the potential to correct human genetic disorders. In gene therapy, a defective gene is replaced by using a virus to insert a normal gene into the cells of an individual. This treatment will be most successful if the virus is inserted into cells that
(1) lack a nucleus
(2) are recycled after death, rather than removed from the body
(3) carry out one specific function, rather than multiple functions
(4) continue to divide during the life of the patient  18_____

19. In one town, some people support a proposal to build a shopping mall on a large, undeveloped lot, because it would increase business and create new jobs. As a trade-off, the shopping mall would cause a decrease in the
(1) amount of air pollution
(2) volume of garbage and litter
(3) amount of wastewater entering the local sewage system
(4) variety of wildlife populations in the area  19_____

20. The human female reproductive system is represented to the right. Which structure produces chemicals that regulate the reproductive cycle?
(1) A  (2) B  (3) C  (4) D  20_____

21. The accompanying diagram represents a cell structure involved in converting energy stored in organic molecules into a form used by animal cells. The arrows represent the movement of which substances?
(1) carbon dioxide and sugar  (3) ATP and carbon dioxide
(2) oxygen and ATP  (4) oxygen and sugar  21_____

22. The accompanying diagram shows a concept map. Which label correctly identifies what X represents in the concept map?
(1) nucleus  (3) autotrophic cell
(2) chromosome  (4) heterotrophic cell  22_____

23. The accompanying diagrams represent two molecules that are involved in metabolic activities in some living cells. The shape of each of the molecules is important because
(1) molecules having different shapes are always found in different organisms
(2) the shape of a molecule determines how it functions in chemical reactions
(3) the shape of a molecule determines the age of an organism
(4) if the shape of any molecule in an organism changes, the DNA in that organism will also change  23_____

Living Environment – June ’15
24. In the early 1900s, experiments were conducted on two caterpillar species. The members of the two species were each divided into two groups. One group of each species was placed under red light, while the other group of each species was kept in the dark. When the caterpillars developed into butterflies, their wings showed extreme color differences. Exposure to red light resulted in intensely colored wings, while those kept in the dark had paler wing colors. The color differences were most likely due to
(1) mutations in the color-producing genes
(2) the caterpillars in the red light producing more DNA
(3) gene expression being affected by the environment
(4) the caterpillars in the dark evolving less than those in the light

25. A student used a microscope to observe a single-celled organism. As he watched, it looked as if the organism split into two cells. He made drawings, shown to the right of the organism over a short period of time. Which process did the student record in his drawings?
(1) genetic engineering
(2) asexual reproduction
(3) selective breeding
(4) gamete formation

26. Medical professionals are concerned with the increase in the number of bacterial species that are resistant to antibiotics. Once resistance appears in a bacterial population, it spreads rapidly. This is most likely because
(1) populations of resistant bacteria are small
(2) exposure to antibiotics increases the rate of reproduction in bacteria
(3) resistant bacteria are small when compared to non-resistant bacteria.
(4) resistant bacteria survive in greater numbers and pass the trait to their offspring

27. When getting a vaccination, which substance is injected into the body?
(1) bacteria to combat a pathogen
(2) white blood cells to engulf a pathogen
(3) a weakened form of a virus
(4) antibiotics to kill a virus

28. Many beverage companies are required to recycle bottles and cans because this activity directly reduces
(1) air pollution and destruction of the ozone shield
(2) overpopulation and soil erosion
(3) solid waste and depletion of resources
(4) thermal pollution and extinction of wildlife
76. A and B below represent two different slide preparations of elodea leaves. Elodea is a plant found in streams and ponds in New York State.

The water used on slide A contained 1% salt and 99% water.
The salt solution used on slide B contained 6% salt and 94% water.
Elodea cells normally contain 1% salt.

![Elodea leaf mounted in 1% salt solution](A)
![Elodea leaf mounted in 6% salt solution](B)

Five minutes after the slides were prepared, a student using a compound light microscope to observe the cells in leaves A and B would most likely see that
(1) water had moved out of the cells of the leaf on slide A
(2) salt had moved into the cells of the leaf on slide A
(3) water had moved out of the cells of the leaf on slide B
(4) salt had moved out of the cells of the leaf on slide B

76 _____

77. The table below shows the food sources for two different species of Galapagos finches on an island.

<table>
<thead>
<tr>
<th>Two Galapagos Finches and Their Sources of Food</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Vegetarian finch</td>
</tr>
<tr>
<td><em>Platyspiza crassirostris</em></td>
</tr>
<tr>
<td>Cactus finch</td>
</tr>
<tr>
<td><em>Geospiza scandens</em></td>
</tr>
</tbody>
</table>

State *one* reason why these two species probably do *not* live in the same area of this island. [1]

________________________________________________________________
________________________________________________________________
________________________________________________________________

84 June 2018
Living Environment
Base your answers to questions 78 and 79 on the information below and on your knowledge of biology.

During a lab activity, a 14-year-old student took his resting pulse rate. He counted 20 beats in 20 seconds. He calculated his pulse rate for a minute and compared the result to the data shown in the table below.

### Normal Pulse Rate Ranges

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Resting Heart Rate (beats per minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children (ages 6-15)</td>
<td>70 – 100</td>
</tr>
<tr>
<td>Adults (ages 18 and over)</td>
<td>60 – 100</td>
</tr>
</tbody>
</table>

78. According to the data table, does the student’s pulse rate fall within the normal range? Circle yes or no and support your answer. [1]

[ ] yes  [ ] no

________________________________________________________________
________________________________________________________________

79. Using a biological explanation, state one reason why a person’s heart rate increases during exercise. [1]

________________________________________________________________
________________________________________________________________

80. The chart below shows the molecular comparison between several species.

<table>
<thead>
<tr>
<th></th>
<th>DNA</th>
<th>GTG</th>
<th>GAC</th>
<th>TGA</th>
<th>GGA</th>
<th>CTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>mRNA</td>
<td>CAC</td>
<td>CUG</td>
<td>ACU</td>
<td>CCU</td>
<td>GAG</td>
<td></td>
</tr>
<tr>
<td>Amino acid</td>
<td>His</td>
<td>Leu</td>
<td>Thr</td>
<td>Pro</td>
<td>Glu</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species X</th>
<th>DNA</th>
<th>GTG</th>
<th>GAC</th>
<th>AGA</th>
<th>GGA</th>
<th>CAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>mRNA</td>
<td>CAC</td>
<td>CUG</td>
<td>UCU</td>
<td>CCU</td>
<td>GUG</td>
<td></td>
</tr>
<tr>
<td>Amino acid</td>
<td>His</td>
<td>Leu</td>
<td>Ser</td>
<td>Pro</td>
<td>Val</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species Y</th>
<th>DNA</th>
<th>GTG</th>
<th>GAC</th>
<th>AGA</th>
<th>GGA</th>
<th>CAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>mRNA</td>
<td>CAC</td>
<td>CUG</td>
<td>UCU</td>
<td>CCU</td>
<td>GUG</td>
<td></td>
</tr>
<tr>
<td>Amino acid</td>
<td>His</td>
<td>Leu</td>
<td>Ser</td>
<td>Pro</td>
<td>Val</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species Z</th>
<th>DNA</th>
<th>GTA</th>
<th>GAC</th>
<th>TGA</th>
<th>GGA</th>
<th>CTC</th>
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<tbody>
<tr>
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<td>CUG</td>
<td>ACU</td>
<td>CCU</td>
<td>GAG</td>
<td></td>
</tr>
<tr>
<td>Amino acid</td>
<td>His</td>
<td>Leu</td>
<td>Thr</td>
<td>Pro</td>
<td>Glu</td>
<td></td>
</tr>
</tbody>
</table>

Identify which species is likely to be more closely related to *Botana curus*. Support your answer. [1]

Species: ____________________

Support: ____________________
81. A factor that contributed to the evolution of finches on the Galapagos Islands was most likely the
(1) lack of variation in beak structure of the finches
(2) isolation of the finches on separate islands
(3) relatively constant atmospheric temperature
(4) total lack of competition for food

Base your answers to questions 82 and 83 on the diagram below and on your knowledge of biology. The diagram represents a laboratory setup.

A starch solution in a test tube was separated from the water in a beaker by a dialysis membrane. One hour later, it was observed that the liquid had risen in the test tube.

82. The rise of the liquid in the test tube that was observed after one hour can be explained as a result of the
(1) starch solution moving into the test tube and out of the beaker
(2) water moving from the beaker into the test tube
(3) large starch molecules blocking the dialysis membrane
(4) dialysis membrane acting as a barrier to the water molecules

83. If a starch indicator solution was initially added to the water in the beaker, describe one observation that would be made after one hour. [1]

________________________________________________________________
________________________________________________________________
________________________________________________________________
84. The diagram represents an electrophoresis gel that was used to separate DNA fragments. Lanes 1, 2, and 3 contain DNA samples that were treated with the same restriction enzyme.

Explain why the DNA sample in lane 3 did not separate into fragments. [1]

85. An experiment is performed to determine the effect of watching basketball games on pulse rates. Ten students agreed to wear devices that monitor pulse rates while watching a basketball game between competitive opponents. Their pulse rates were measured every minute for five minutes in the first quarter of the game. The data collected indicated that pulse rates did not change significantly during the monitored period. State one way that this experiment could be improved to obtain a valid conclusion. [1]
LIVING ENVIRONMENT

ANSWERS

AND

EXPLANATIONS