



AP[®] Biology
2011 Free-Response Questions
Form B

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2011 AP[®] BIOLOGY FREE-RESPONSE QUESTIONS (Form B)

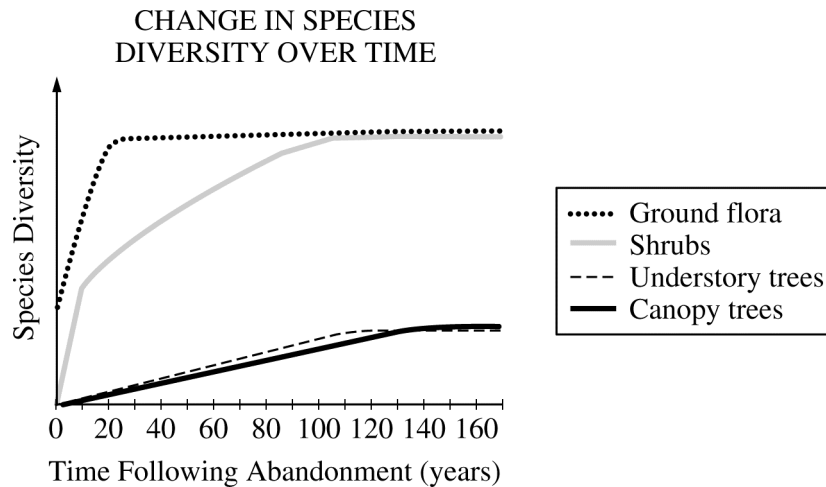
BIOLOGY
SECTION II

Time—1 hour and 30 minutes

Directions: Answer all questions.

Answers must be in essay form. Outline form is not acceptable. Labeled diagrams may be used to supplement discussion, but in no case will a diagram alone suffice. It is important that you read each question completely before you begin to write. Write all your answers on the pages following the questions in the goldenrod booklet.

- The cell cycle is fundamental to the reproduction of eukaryotic cells.
 - Describe** the phases of the cell cycle.
 - Explain** the role of THREE of the following in mitosis or cytokinesis.
 - Kinetochores
 - Microtubules
 - Motor proteins
 - Actin filaments
 - Describe** how the cell cycle is regulated and **discuss** ONE consequence of abnormal regulation.
- Ecological succession describes the pattern of changes in communities over time. The graph below shows changes in plant diversity following the abandonment of an agricultural field in a temperate biome.

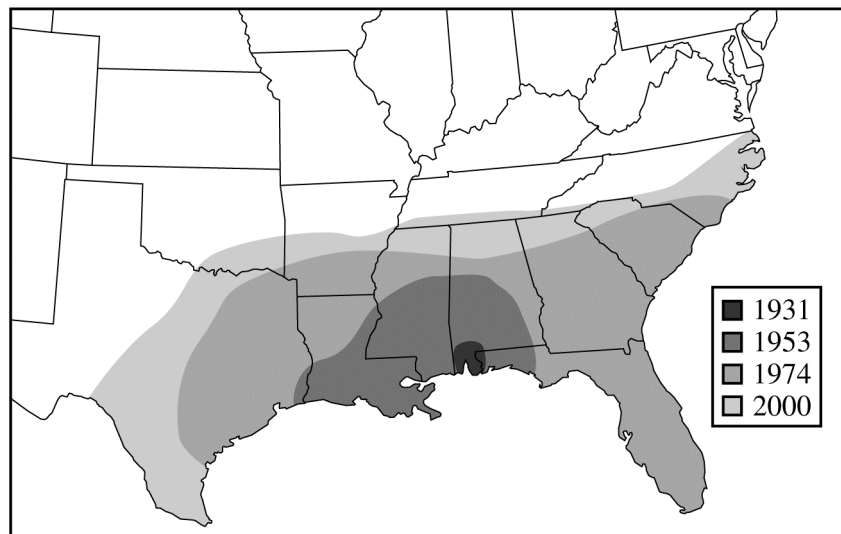


- Discuss** the differences in plant diversity shown in the graph and **explain** how the changes affect the animal species composition between years 0 and 120.
- Identify** TWO biotic and TWO abiotic factors and **discuss** how each could influence the pattern of ecological succession.
- Design** a controlled experiment to determine how the diversity of plant species in a newly abandoned field would be affected by large herbivores.

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3. Invasive species, such as red fire ants, introduced into an ecosystem often threaten native plants and animals.
- (a) **Describe** THREE different factors that contribute to the success of invasive species in an ecosystem.
 - (b) **Discuss** THREE ways that an invasive species can affect its new ecosystem.
 - (c) The map indicates the spread of the red fire ant after its initial entrance into the United States at the port of Mobile, Alabama, in the 1930s. **Discuss** TWO environmental factors that might have determined the pattern of fire ant invasion.
 - (d) **Discuss** TWO possible methods of eradicating or slowing the spread of these ants, including the environmental consequences of each method.

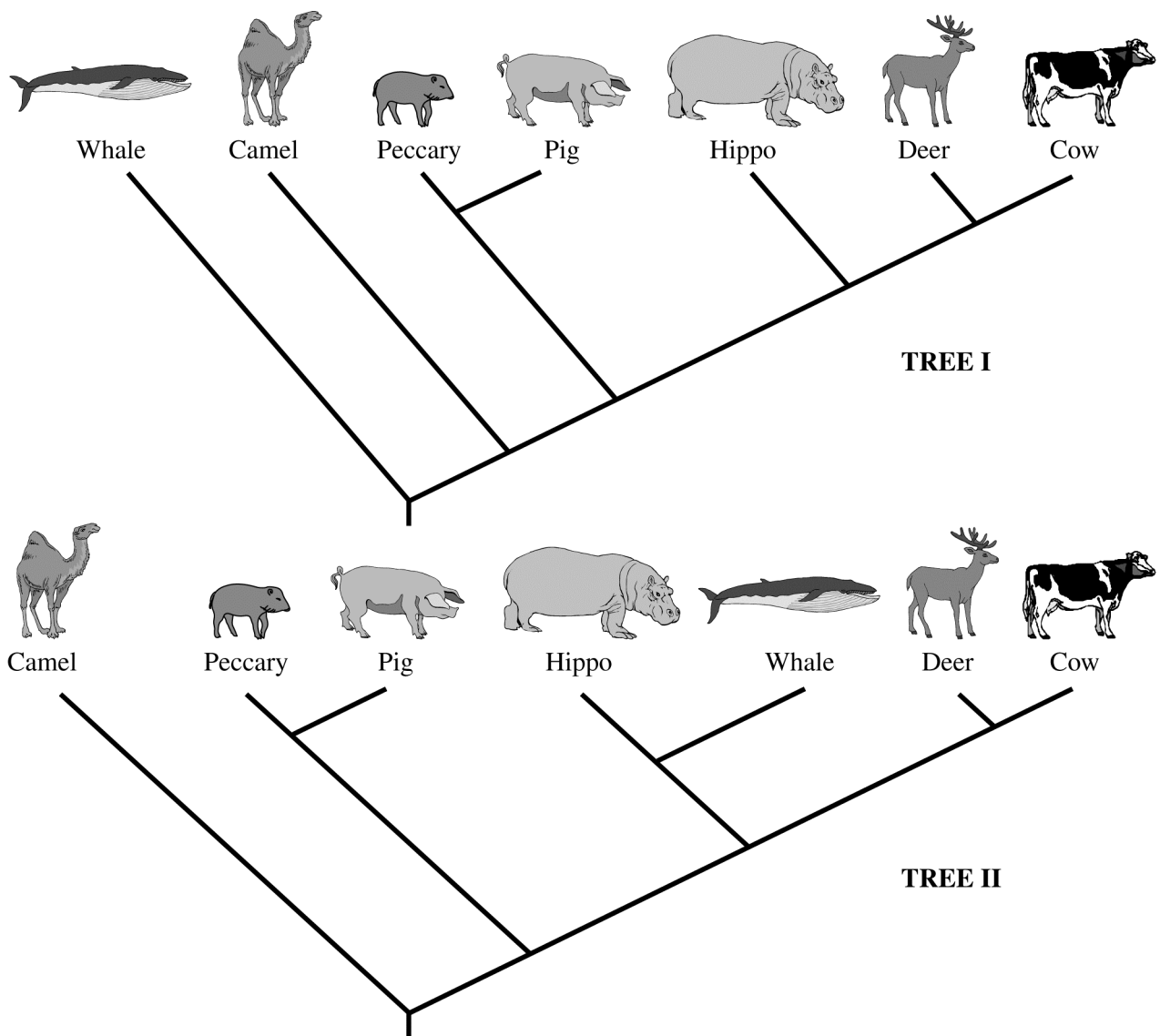
FIRST REPORTED OCCURRENCE OF RED
IMPORTED FIRE ANT, *SOLENOPSIS INVICTA*



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4. Phylogeny reflects the evolutionary history of organisms.

- (a) **Discuss** TWO mechanisms of speciation that lead to the development of separate species from a common ancestor.
- (b) **Explain** THREE methods that have been used to investigate the phylogeny of organisms. **Describe** a strength or weakness of each method.
- (c) The two phylogenetic trees represent the relationship of whales to six other mammals. All of the organisms shown have a pulley-shaped astragalus bone in the ankle except for the whale.
- For each tree, **describe** a monophyletic group, the closest relative to the whale, and the point at which the pulley astragalus was lost or gained.
 - Based on the principle of parsimony (the simplest explanation is the best) and the genomic information in the table shown, **identify** which tree is the best representation of the evolutionary relationship of these animals, and **justify** your answer.



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DATA ON PRESENCE
OF SPECIFIC DNA SEQUENCES

+ sequence present
– sequence absent
? undetermined

Locus	1	2	3	4	5	6	7	8	9	10	11	12	13
Cow	–	–	–	–	–	+	+	+	+	+	+	+	–
Deer	–	–	–	–	–	+	?	+	+	+	+	+	–
Whale	+	+	+	+	+	–	?	+	+	–	?	+	–
Hippo	?	–	+	+	+	–	+	+	+	–	?	+	–
Pig	–	–	?	–	–	–	?	–	?	–	–	+	+
Peccary	?	?	?	?	?	?	?	?	?	?	?	?	+
Camel	–	–	–	–	–	–	–	–	–	–	–	–	–

END OF EXAM