



AP[®] Biology
2005 Free-Response Questions
Form B

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2005 AP[®] BIOLOGY FREE-RESPONSE QUESTIONS (Form B)

BIOLOGY

SECTION II

Planning Time—10 minutes

Writing Time—90 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.

1. Survival of organisms depends on adaptive behavior and species interactions.

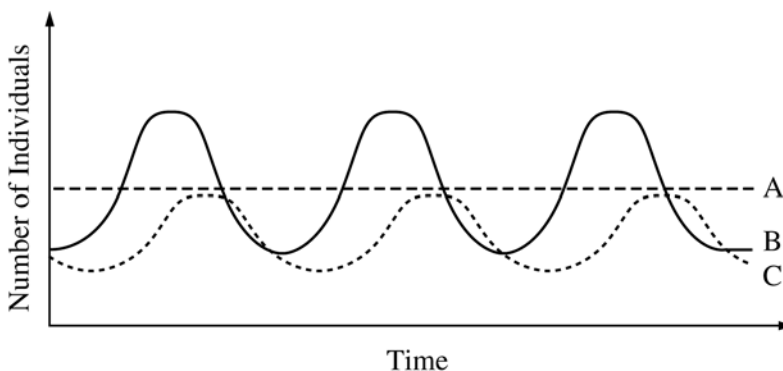
(a) Behaviors of organisms may be influenced by environmental factors. Select two of the following types of behavior. For each type, explain

(i) how the environment affects the behavior, and

(ii) why this behavior increases the survivorship of individuals of a species.

- Taxis/Kinesis
- Migration
- Courtship

(b) Interactions among populations may have an effect on densities of the species that interact. Predation represents an important interaction among populations. The curves below depict the population densities of three species: a small herbivore, a larger herbivore, and a carnivore.



Identify which curve represents which of the species listed, and **justify** your answer by describing the changes in the population densities of these three species over time.

2. In the evolution of organisms, major adaptations arose in certain groups, opening new evolutionary possibilities. For **two** of the following types of organisms, discuss the evolutionary significance of the features listed.

- Flowering plants: flowers, fruits and seeds, and broad leaves
- Flatworms: three germ layers, bilateral symmetry, and cephalization
- Segmented worms: segmentation, coelom, and digestive system
- Reptiles: amniotic eggs, waterproof skin, and well-developed lungs

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3. Protein synthesis is vital for cell growth and metabolism.
- (a) Describe transcription and translation.
 - (b) Identify similarities between transcription and translation.
 - (c) Identify differences between transcription and translation.
 - (d) Describe structural changes that can occur to a protein after translation to make it function properly.
4. Water potential in potato cells was determined in the following manner. The initial masses of six groups of potato cores were measured. The potato cores were placed in sucrose solutions of various molarities. The masses of the cores were measured again after 24 hours. Percent changes in mass were calculated. The results are shown below.

Molarity of Sucrose in Beaker	Percent Change in Mass
0.0 <i>M</i>	18.0
0.2	5.0
0.4	-8.0
0.6	-16.0
0.8	-23.5
1.0	-24.0

- (a) Graph these data on the axes provided. From your graph, find the apparent molar concentration (osmolarity) of the potato core cells.
- (b) What are the components of water potential, and why is water potential important for the movement of water in plants?
- (c) Predict what would happen to typical animal cells placed in 0.0 *M* and 1.0 *M* sucrose solutions, and explain your prediction.

