



**2000 Advanced Placement Program®
Free-Response Questions**

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2000 AP® BIOLOGY FREE-RESPONSE QUESTIONS

BIOLOGY

SECTION II

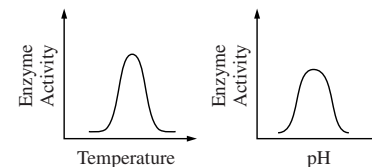
Time—90 minutes

4 Questions

Directions: Answer all questions. Write your answers on the pages following the questions in the pink booklet.

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.

1. The effects of pH and temperature were studied for an enzyme-catalyzed reaction. The following results were obtained.



- a) How do (1) temperature and (2) pH affect the activity of this enzyme? In your answer, include a discussion of the relationship between the structure and the function of this enzyme, as well as a discussion of how structure and function of enzymes are affected by temperature and pH.
- b) Describe a controlled experiment that could have produced the data shown for either temperature or pH. Be sure to state the hypothesis that was tested here.
2. Feedback mechanisms are used by organisms to maintain the steady-state physiological condition known as homeostasis. Choose **three** of the following and for each, explain how feedback mechanisms maintain homeostasis.
- a) Blood glucose concentration.
 - b) Calcium ion concentration in blood.
 - c) Body temperatures in mammals.
 - d) Osmolarity of the blood.
 - e) Pulse rate in mammals.

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3. Information transfer is fundamental to all living organisms. For **two** of the following examples, explain in detail how the transfer of information is accomplished.
- a) The genetic material in one eukaryotic cell is copied and distributed to two identical daughter cells
 - b) A gene in a eukaryotic cell is transcribed and translated to produce a protein
 - c) The genetic material from one bacterial cell enters another via transformation, transduction, **or** conjugation
4. To survive, organisms must be capable of avoiding, and/or defending against, various types of environmental threats. Respond to **each** of the following.
- a) Describe how adaptive coloration, mimicry, **or** behavior function as animal defenses against predation. Include **two** examples in your answer.
 - b) Describe how bacteria **or** plants protect themselves against environmental threats. Include **two** examples in your answer.
 - c) Compare the human primary immune response with the secondary immune response to the same antigen.

END OF EXAMINATION