AP® Biology
2002 Free-Response Questions
Form B

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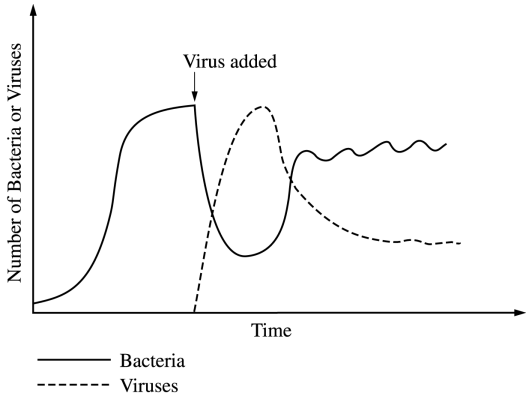
BIOLOGY
SECTION II
Time—1 hour and 30 minutes

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 this booklet.

1. Bacteria were cultured in a system that allowed for the continual addition of fresh nutrients and the removal of waste products. Bacteriophage (virus) were added at the time shown and the following population changes were observed.



(a) **Describe** and explain the observed results.

(b) **Discuss** the infection cycle of a DNA virus from attachment to lysis.

(c) **Describe** how the genome of a retrovirus like HIV (Human Immunodeficiency Virus) becomes incorporated into the genome of the host cell.

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2. In mammals, heart rate during periods of exercise is linked to the intensity of exercise.
   (a) **Discuss** the interactions of the respiratory, circulatory, and nervous systems during exercise.
   (b) **Design** a controlled experiment to determine the relationship between intensity of exercise and heart rate.
   (c) On the axes provided below, **indicate** results you expect for both the control and the experimental groups for the controlled experiment you described in part B. Remember to label the axes.

3. The physical form of cells and organisms is often influenced by special structural polymers. Choose **one** polymer from **each** of the following three pairs of polymers:

   Pair 1: tubulin . . myosin

   Pair 2: cellulose . . chitin

   Pair 3: messenger RNA . . transfer RNA

   For each of the three polymers you have chosen, **describe** its
   (a) structure, and
   (b) role in a cell or organism.

4. A triploblastic animal is one in which three germ layers form during embryonic development. Triploblastic animals include acoelomate, pseudocoelomate, and coelomate (eucoelomate) organisms.
   (a) **Identify** the three germ layers of a triploblastic embryo and **discuss** the fates of these germ layers in embryonic development.
   (b) **Describe** acoelomate, pseudocoelomate, and coelomate body plans. **Identify** an animal that is representative of **each** of these types of body plan.
   (c) **Compare and contrast** the digestive systems of an acoelomate and a coelomate organism.

END OF EXAMINATION

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