

Test-Taking Tip

For questions containing the words **NOT** or **EXCEPT**, begin by eliminating each answer choice that *does* fit the characteristic in question. After eliminating all but one of the choices, check to see that your answer is correct by confirming that it does *not* fit the characteristic in question.

Directions: Choose the letter that best answers the question or completes the statement.

- Which of the following can be used to produce organisms with desirable traits?
 - inbreeding
 - genetic engineering
 - inducing mutations

(A) I only (D) II and III only
(B) II only (E) I, II, and III
(C) I and III only
- Which of the following characteristics does NOT apply to a plasmid?

(A) made of DNA (D) accepts foreign DNA
(B) in bacterial cells (E) in animal cells
(C) circular

Questions 3–4

A researcher chooses a plasmid with a gene that confers resistance to the antibiotic ampicillin. She isolates and tries to insert a human gene that codes for a protein into the plasmid. Next, she transforms bacteria using the plasmid. She then cultures the new bacteria on a nutrient medium containing ampicillin.

- What can the researcher conclude about the bacteria that grow on the nutrient medium?
 - They are resistant to ampicillin.
 - They contain recombinant DNA.
 - They contain a human gene.

(A) I only (D) II and III only
(B) II only (E) I, II, and III
(C) I and III only
- Which of the following would indicate that the bacteria contain the human gene?
 - They are resistant to ampicillin.
 - They produce the human protein encoded by the human gene.
 - They produce ampicillin.

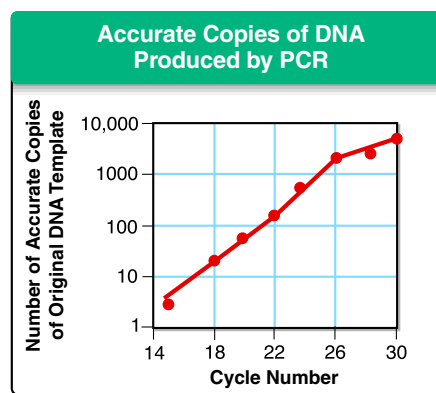
(A) I only (D) II and III only
(B) II only (E) I, II, and III
(C) I and III only

Questions 5–8 Each of the lettered choices below refers to the following numbered statements. Select the best lettered choice. A choice may be used once, more than once, or not at all.

- (A) Gel electrophoresis (D) Inbreeding
(B) Plasmid (E) DNA synthesizer
(C) Polymerase chain reaction
- Used to insert new genes into plant cells
 - Makes many copies of a DNA sample
 - Assembles short sequences of DNA
 - Separates DNA fragments

Questions 9–10

The graph below shows the number of accurate copies of DNA produced by polymerase chain reaction (PCR).



- What can you conclude about cycles 18–26?

(A) PCR produced accurate copies of template DNA at an exponential rate.
(B) The amount of DNA produced by PCR doubled with each cycle of the reaction.
(C) The DNA copies produced by PCR were not accurate copies of the original DNA template.
(D) A and B only
(E) A and C only
- Based on the graph, which of the following might have happened between cycles 26 and 28?

(A) PCR stopped producing accurate copies of the template.
(B) The rate of the reaction slowed down.
(C) All the template DNA was used up.
(D) A and C only
(E) B and C only

Standardized Test Prep

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|------|------|-------|
| 1. E | 5. B | 9. A |
| 2. E | 6. C | 10. B |
| 3. A | 7. E | |
| 4. B | 8. A | |

Writing in Science

Students should support their positions with examples of genetic engineering. They should demonstrate an understanding of both selective breeding and genetic engineering and the advantages and disadvantages of each.

Performance-Based Assessment

In their procedures, students should first describe the insertion of the human insulin into the bacterial plasmid by cutting both DNA molecules with the same restriction enzyme and mixing the fragments together. Then, they should describe transforming the plasmid into the bacterial cell as it is described in Section 13–3. Illustrations should look similar to Figure 13–9.

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