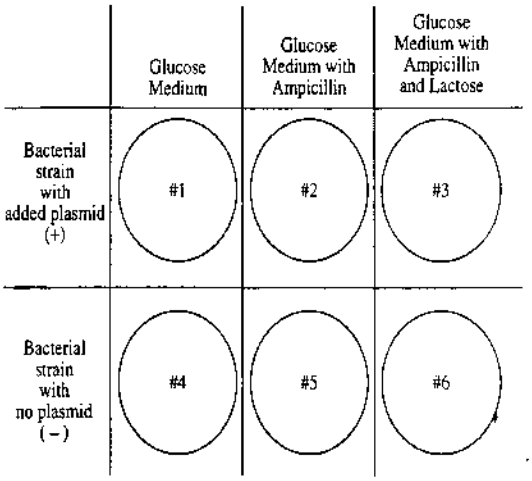
Questions 1-4

Directions: Each group of questions below concerns an experimental or laboratory situation or data. In each case, first study the description of the situation or data. Then choose the one best answer to each question following it and fill in the corresponding oval on the answer sheet.

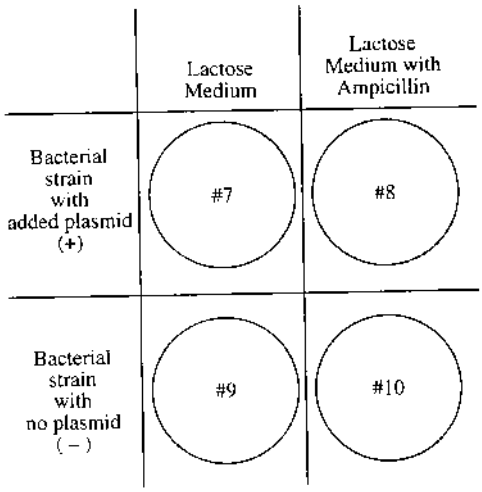
A scientist is using an ampicillinsensitive strain of bacteria that cannot use lactose because it has a nonfunctional gene in the *lac* operon. She has two plasmids. One contains a functional copy of the affected gene of the *lac* operon, and the other contains the gene for ampicillin resistance. Using restriction enzymes and DNA ligase, she forms a recombinant plasmid containing both genes. She then adds a high concentration of the plasmid to a tube of the bacteria in a medium for bacterial growth that contains glucose as the only energy source. This tube (+) and a control tube () with similar bacteria but no plasmid are both incubated under the appropriate conditions for growth and plasmid uptake. The scientist then spreads a sample of each bacterial culture (+ and) on each of the three types of plates indicated below.



1. If no new mutations occur, it would be most reasonable to expect bacterial growth on which of the following plates?
   (A) 1 and 2 only
   (B) 3 and 4 only
   (C) 5 and 6 only
   (D) 4, 5, and 6 only
   (E) 1, 2, 3, and 4 only

2. The scientist used restriction enzymes for what purpose in the experiment? *
   (A) To make the plasmid small enough to transform cells
   (B) To make the plasmid enter the cells
   (C) To make cuts in the plasmid DNA
   (D) To enable the fragments of DNA to form covalent bonds
   (E) To enable the plasmid to recognize the bacterial cells

3. If the scientist had forgotten to use DNA ligase during the preparation of the recombinant plasmid, bacterial growth would most likely have occurred on which of the following?
   (A) 1 and 2 only
   (B) 1 and 4 only
   (C) 4 and 5 only
   (D) 1, 2, and 3 only
   (E) 4, 5, and 6 only



4. If the scientist used the cultures to perform another experiment as shown above, using medium that contained lactose as the only energy source, growth would most likely occur on which of the following plates?

(A) 10 only
(B) 7 and 8 only
(C) 7 and 9 only
(D) 8 and 10 only
(E) 9 and 10 only

1999 AP Exam

E
C
B
B