You are given the following statements:

*No man is an island*
*Every island is surrounded by water*

A logical conclusion from the above is that

**A.** some men are surrounded by water.
**B.** some things surrounded by water are not men.
**C.** some men are not surrounded by water.
**D.** no man is surrounded by water.
**E.** no men are not surrounded by water.

[1991 CAT 3, A24]

**Question 3**

Consider the truth table shown:

| p | q | |
|---|---|---|
| T | T | T |
| T | F | F |
| F | T | T |
| F | F | T |

Which one of the following is the correct heading for the final column?

**A.** $p \wedge q$ **B.** $p \vee q$ **C.** $\sim p \wedge q$ **D.** $\sim p \vee q$ **E.** $\sim p \wedge \sim q$

[1989 Trial CAT 3, C4.3]

**Question 4**

Which one of the following is **not** a tautology?

**A.** $p \vee \sim p$ **B.** $p \Leftrightarrow \sim\sim p$ **C.** $(p \Rightarrow q) \Leftrightarrow (q \Rightarrow p)$
**D.** $[p \wedge (p \Rightarrow q)] \Rightarrow q$ **E.** $p \wedge q \Rightarrow p$

[1989 Trial CAT 3, C4.4]

**Question 8**

Consider the truth table shown below:

| p | q | |
|---|---|---|
| T | T | T |
| T | F | F |
| F | T | T |
| F | F | T |

The correct heading for the final column is

**Question 9**

Which **one** of the following is a tautology?

**A.** $p \wedge \sim q$ **B.** $(p \Rightarrow q) \Rightarrow (q \Rightarrow p)$ **C.** $p \Rightarrow \sim p$
**D.** $p \wedge p$ **E.** $p \vee (\sim p)$

[1990 Trial CAT 3, C9.2]

***Note for questions 3 - 7:*** *The Boolean algebra operations may be denoted by* $\cup$ , $\cap$ *and* $'$ . *It is common to use* $+$ *instead of* $\cup$ , $\bullet$ *instead of* $\cap$ *and* — *and* $\sim$ *instead of* $'$ .

**Question 3**

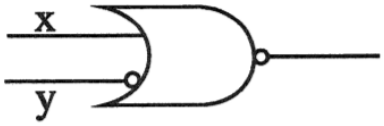
The Boolean expression $(x \bullet y) \bullet (x + y')$ is equivalent to

**A.** $x \bullet y$ **B.** $x \bullet y'$ **C.** $x + y'$ **D.** $(x + y)'$ **E.** $x' \bullet y'$

[1989 Trial CAT 3, C5.3]

**Question 4**

To which one of the following Boolean expressions does the output of the logic diagram shown correspond?




**A.** $x' \bullet y'$ **B.** $x \bullet y'$ **C.** $x \bullet y$ **D.** $(x + y)'$ **E.** $x' \bullet y$

[1989 Trial CAT 3, C5.4]

**Question 18**

The Boolean expression corresponding to $p \rightarrow q$ is $p' + q$ . The Boolean expression corresponding to $\sim q \rightarrow \sim p$ is

**A.** $(p')' + q'$ **B.** $(p' + q)'$ **C.** $q' + p$ **D.** $(q')' + p'$ E. $q' + p'$

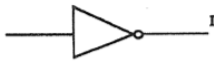
[1991 CAT 3, C10.5]

**Question 19**

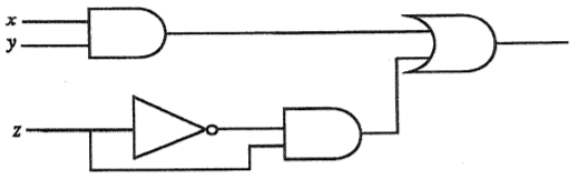
In this question


represents an 'and' gate


represents an 'or' gate


represents an 'inverter or 'not' gate

The Boolean expression corresponding to the output of the circuit




is equivalent to

**A.** $x.y$ **B.** $(x.y) + z$ **C.** $(x.y) + z'$
**D.** $(x.y) + z + z'$ **E.** 0

[1991 CAT 3, C10.6]