

①

a)  $A \cdot \bar{B} \cdot \bar{C}$

b)  $A \cdot B \cdot \bar{C}$

c)  $A \cdot B \cdot C$

d)  $A \cup B \cup C$

e)  $\bar{A} \cdot \bar{B} \cdot \bar{C}$

② a)

| A | B | $\overline{A}B$ | $\overline{A} \cup \overline{B}$ |
|---|---|-----------------|----------------------------------|
| 0 | 1 | 1               | 1                                |
| 1 | 0 | 1               | 1                                |
| 0 | 0 | 1               | 1                                |
| 1 | 1 | 0               | 0                                |

верно.

б)

| A | B | $\overline{A \cup B}$ | $\overline{A} \cdot \overline{B}$ |
|---|---|-----------------------|-----------------------------------|
| 0 | 1 | 0                     | 0                                 |
| 1 | 0 | 0                     | 0                                 |
| 0 | 0 | 1                     | 1                                 |
| 1 | 1 | 0                     | 0                                 |

верно



c)

| A | B | C | $(A \cup B)C$ | $AC \cup BC$ |
|---|---|---|---------------|--------------|
| 0 | 0 | 0 | 0             | 0            |
| 0 | 0 | 1 | 0             | 0            |
| 0 | 1 | 0 | 0             | 0            |
| 1 | 0 | 0 | 0             | 0            |
| 0 | 1 | 1 | 1             | 1            |
| 1 | 1 | 0 | 0             | 0            |
| 1 | 0 | 1 | 1             | 1            |
| 1 | 1 | 1 | 1             | 1            |

верно

d)

| A | B | $(A \cup B) \overline{AB}$ | $A\overline{B} \cup \overline{A}B$ |
|---|---|----------------------------|------------------------------------|
| 0 | 1 | 1                          | 1                                  |
| 1 | 0 | 1                          | 1                                  |
| 0 | 0 | 0                          | 0                                  |
| 1 | 1 | 0                          | 0                                  |

верно

③

$$C = A_5 \cup (A_3 \cdot (A_1 A_4 \cup A_2 A_4 \cup A_1 A_2 \cup A_4 \cup A_1 A_2 A_4))$$



$$\textcircled{4} a) (A \cup B) \cap (A \cup \bar{B}) = A \cap A \cup A \cap \bar{B} \cup B \cap A \cup B \cap \bar{B} = A \cup A \cap \bar{B} \cup BA = A \cup A = A.$$

$$b) (A \cup B) \cap (B \cup C) = AB \cup AC \cup BB \cup BC = AB \cup AC \cup B \cup BC = \underbrace{B \cup AB \cup AC} = B \cup AC$$

$$c) (A \cup B) \cap (\bar{A} \cup \bar{B}) \overset{B}{\cap} (\overset{B}{A} \cup \bar{B}) = (\overset{B}{A} \bar{A} \cup A \bar{B} \cup B \bar{A} \cup B \bar{B}) \cap (\overset{B}{A} \cup \bar{B}) = (A \bar{B} \cup B \bar{A}) \cap (A \cup \bar{B}) = A \bar{B} A \cup A \bar{B} \bar{B} \cup B \bar{A} A \cup B \bar{A} \bar{B} = A \bar{B} \cup A \bar{B} = A \bar{B}$$

5

$$a) \quad \overline{\bigcup_{\lambda \in \Lambda} A_\lambda} = \bigcap_{\lambda \in \Lambda} \overline{A_\lambda}$$

$$\omega \in \overline{\bigcup_{\lambda \in \Lambda} A_\lambda} \Leftrightarrow \omega \notin \bigcup_{\lambda \in \Lambda} A_\lambda \Leftrightarrow \nexists \lambda \in \Lambda : \omega \in A_\lambda \Leftrightarrow$$

$$\Leftrightarrow \forall \lambda \in \Lambda \hookrightarrow \omega \notin A_\lambda \Leftrightarrow \forall \lambda \in \Lambda \hookrightarrow \omega \in \overline{A_\lambda} \Leftrightarrow$$

$$\Leftrightarrow \omega \in \bigcap_{\lambda \in \Lambda} \overline{A_\lambda}$$

$$b) \quad \overline{\bigcap_{\lambda \in \Lambda} A_\lambda} = \bigcup_{\lambda \in \Lambda} \overline{A_\lambda}$$

$$\omega \in \overline{\bigcap_{\lambda \in \Lambda} A_\lambda} \Leftrightarrow \exists \lambda \in \Lambda : \omega \in \overline{A_\lambda} \Leftrightarrow$$

$$\Leftrightarrow \exists \lambda \in \Lambda : \omega \notin A_\lambda \Leftrightarrow \omega \notin \bigcap_{\lambda \in \Lambda} A_\lambda \Leftrightarrow \omega \in \overline{\bigcap_{\lambda \in \Lambda} A_\lambda}$$



II

7)

а) 3 партии из 4х:

$$\frac{C_4^3}{2^4} = \frac{1}{4}$$

5 партий из 8:

$$\frac{C_8^5}{2^8} = \frac{7}{32}$$

$$\frac{1}{4} > \frac{7}{32} //$$

б) не менее 3х:

$$\frac{C_4^3}{2^4} + \frac{C_4^4}{2^4} = \frac{1}{4} + \frac{1}{16} = \frac{5}{16}$$

не менее 5ти:

$$\frac{C_8^5 + C_8^6 + C_8^7 + C_8^8}{2^8} = \frac{1}{2^8} \left( \frac{8!}{5!3!} + \frac{8!}{6!2!} + \frac{8!}{7!} + 1 \right) =$$

$$= \frac{1}{2^8} (56 + 28 + 9) = \frac{93}{256}$$

Ответ: а) 3 из 4 б) не менее 5 из 8.