

## H29問2

$$S = \{a, b, c, d\}, \quad \mathcal{O} = \{\phi, \underbrace{\{a\}}_A, \underbrace{\{c\}}_B, \underbrace{\{a, c\}}_C, \underbrace{\{b, c, d\}}_D, S\}$$

(1) ①  $\phi, S \in \mathcal{O}$

②  $\forall O_1, O_2 \in \mathcal{O}$

④  $O_1 = \phi \text{ or } O_2 = \phi \Rightarrow O_1 \cap O_2 = \phi \in \mathcal{O}$

⑤  $O_1 = S \text{ or } O_2 = S \Rightarrow O_1 \cap O_2 = O_1, O_2 \in \mathcal{O}$

⑥  $O_1, O_2 \Rightarrow O_1 = \{a\} \Rightarrow O_1 \cap O_2 = \{a, c\} \text{ or } \{a, b, c, d\} \in \mathcal{O}$

$O_1 = \{c\} \Rightarrow O_1 \cap O_2 = \{b, c, d\} \in \mathcal{O}$

$O_1 = \{a, c\} \Rightarrow O_1 \cap O_2 = \{a, b, c, d\} \in \mathcal{O}$

$O_1 = \{b, c, d\} \Rightarrow O_1 \cap O_2 = S$

③  ~~$\forall \{O_i\}_i \subset \mathcal{O}$~~ , (有限集合なの2"  $\forall O_1, O_2 \in \mathcal{O}$  2" だよ)

~~$\bigcup_{i \in \mathbb{N}} O_i = \mathcal{O}$  の要素 or~~

$\{a\} \cup \{c\}$

$\cup \{a, c\}$

... お互いのものを...

(2)  $\mathbb{F} = \{S, \{b, c, d\}, \{a, b, d\}, \{b, d\}, \{a\}, \phi\}$

$\overline{\{b\}} = (\{b\} \text{ を含む最小の開集合}) = \{b, d\}$

(3)  $\forall x, y (x \neq y) \in S, \exists U, V \in \mathcal{O}, U \cap V = \phi, x \in U, y \in V,$   
 $x = b, y = c$  のとき, 分離できる