

問12 P226

$$Q = CV \text{ [C] ㊤}$$

$$\begin{aligned} Q &= 1.0 \times 10^{-6} \times 30 \\ &= 30 \times 10^{-6} \\ &= 3.0 \times 10^{-5} \end{aligned}$$

$$\therefore \underline{3.0 \times 10^{-5} \text{ [C]}}$$

$$\begin{aligned} Q &= 2.0 \times 10^{-6} \times 30 \\ &= 60 \times 10^{-6} \\ &= 6.0 \times 10^{-5} \end{aligned}$$

$$\therefore \underline{6.0 \times 10^{-5} \text{ [C]}}$$

問13 P228

$$C = \frac{1}{4\pi k} \cdot \frac{S}{d} \text{ ㊤}$$

Aの面積をS, 間隔をdとすると

$$C_A = \frac{1}{4\pi k} \cdot \frac{S}{d} = 1.2 \times 10^{-6}$$

Bは2S,  $\frac{1}{2}d$  ㊤

$$\begin{aligned} C_B &= \frac{1}{4\pi k} \cdot \frac{2S}{\frac{1}{2}d} = \frac{1}{4\pi k} \cdot \frac{4S}{d} \\ &= \frac{1}{4\pi k} \cdot \frac{S}{d} \times 4 \end{aligned}$$

$$= C_A \times 4$$

$$= 1.2 \times 10^{-6} \times 4$$

$$= 4.8 \times 10^{-6}$$

$$\therefore 4.8 \times 10^{-6} \text{ [F]}$$

$$\therefore \underline{4.8 \text{ [}\mu\text{F]}}$$

問14 P228

$$C = \epsilon \frac{S}{d} \text{ ㊤}$$

$$= 8.85 \times 10^{-12} \times \frac{5.00 \times 10^{-4}}{2.50 \times 10^{-3}}$$

$$= 8.85 \times 10^{-12} \times 2 \times 10^{-1}$$

$$= 17.7 \times 10^{-13}$$

$$= 1.77 \times 10^{-12}$$

$$\therefore \underline{1.77 \times 10^{-12} \text{ [F]}}$$

問15 P229

$$\epsilon_r = \frac{C}{C_0} \text{ ㊤}$$

$$C = \epsilon_r C_0$$

$$= 5000 \times 2.0 \times 10^{-12}$$

$$= 10000 \times 10^{-12}$$

$$= 1.0 \times 10^{-8}$$

$$\therefore \underline{1.0 \times 10^{-8} \text{ [F]}}$$

類6 P231

(1) 充電後のコンデンサーの電量Q [C]を求めよ

$$Q = CV \text{ ㊤}$$

$$= 200 \times 10^{-12} \times 40$$

$$= 8000 \times 10^{-12}$$

$$= 8.0 \times 10^{-9} \text{ [C]}$$

誘電体で満たしたコンデンサーを

$$Q = C'V' \text{ とおく。}$$

$$\epsilon_r = \frac{C}{C_0} \text{ ㊤}$$

$$\epsilon_r = \frac{C'}{C}$$

$$C' = \epsilon_r C$$

$$= 5 \times 200 \times 10^{-12}$$

$$= 1000 \times 10^{-12}$$

$$= 1.0 \times 10^{-9} \text{ [F]}$$

$$Q = C'V' \text{ ㊤}$$

$$C'V' = Q$$

$$1.0 \times 10^{-9} \times V' = 8.0 \times 10^{-9}$$

$$V' = 8.0$$

$$\therefore \underline{8.0 \text{ [V]}}$$

(2) (1) ㊤  $C' = 1.0 \times 10^{-9} \text{ [F]}$ 

$$Q' = C'V$$

$$= 1.0 \times 10^{-9} \times 40$$

$$= 40 \times 10^{-9}$$

$$\therefore \underline{4.0 \times 10^{-8} \text{ [C]}}$$