

일반물리2 과제풀이 CH.21

14번.

$$E=850(N/C), \quad A = 2.0m^2$$

$$(a). \quad \Phi = EA = 1.7[k \frac{N^*m^2}{C}]$$

$$(b). \quad \Phi = EA \cos 45^\circ = 12[k \frac{N^*m^2}{C}]$$

$$(c). \quad 0$$

24번.

$$\oint \vec{E} \cdot d\vec{A} = \frac{q_{enc}}{\epsilon_0}$$

$$(a). \quad E(4\pi r^2) = \frac{q_{enc}}{\epsilon_0}, \quad E = \frac{q}{4\pi\epsilon_0 r^2} \hat{r} = \frac{(15 \times 10^{-9} C)}{4\pi(0.022m)^2} \hat{r} = (280kN/C) \hat{r}$$

$$(b). \quad E(4\pi r^2) = \frac{q_{enc}}{\epsilon_0}, \quad E = \frac{q}{4\pi\epsilon_0 r^2} \hat{r} = \frac{(15 \times 10^{-9} C)}{4\pi(0.056m)^2} \hat{r} = (43kN/C) \hat{r}$$

$$(c). \quad E(4\pi r^2) = \frac{q_{enc}}{\epsilon_0}, \quad E = \frac{q}{4\pi\epsilon_0 r^2} \hat{r} = \frac{(15 - 22)10^{-9} C}{4\pi(0.14m)^2} \hat{r} = (-3.2kN/C) \hat{r}$$

29번.

$$(a). \quad E(2\pi rL) = \frac{q_{enc}}{\epsilon_0}, \quad E = \frac{q}{2\pi\epsilon_0 rL} = \frac{\lambda}{2\pi\epsilon_0 r} = \frac{(2.0 \times 10^{-6} C)/(0.5m)}{2\pi\epsilon_0(0.004m)} = 5.1 \times 10^6 [N/C]$$

$$(b). \quad E = \frac{q}{2\pi\epsilon_0 rL} = \frac{\lambda}{2\pi\epsilon_0 r} = \frac{(2.0 \times 10^{-6} C)/(0.5m)}{2\pi\epsilon_0(23m)} = 34 [N/C]$$

33번.

(a). 정전기적 평형 상태의 도체 내부 전기장은 0

$$(b). \quad \sigma = \frac{q}{4\pi r^2} = \frac{5 \times 10^{-6}}{4\pi(0.02m)^2} = 9.95 \times 10^{-4} [C/m^2]$$

52번.

$$\sigma = \frac{Q}{4\pi R^2}$$

$$(a). E(4\pi R^2) = \frac{q_{enc}}{\epsilon_0}, E_{\text{표면}} = \frac{q+Q}{4\pi\epsilon_0 R^2} \hat{r}$$

$$q = E_{\text{표면}}(4\pi\epsilon_0 R^2) - Q$$

$$(b). E_{\text{안쪽}} = \frac{q}{4\pi\epsilon_0 r^2} \quad (r < R), E_{\text{안쪽}} = \frac{q}{4\pi\epsilon_0 r^2} = \frac{R^2}{r^2} E_{\text{표면}} - \frac{Q}{4\pi\epsilon_0 r^2}$$