(3) $$\mathcal{D}_K \cap (\phi + W_\phi) = \phi + (\mathcal{D}_K \cap W_\phi) \subset E.$$

⌈ $W_\phi \cap \mathcal{D}_K = \{\psi \in \mathcal{D}_K : \|\psi\|_N < \delta\}$ is open in $\mathcal{D}_K$?
If we choose l large enough, $V_l = \{\phi \in \mathcal{D}_K : \|\phi\|_l < \frac{1}{l}\}$
$\subset W_\phi \cap \mathcal{D}_K$, since $\|\phi\|_l \geq \|\phi\|_N$. Here $\frac{1}{l} < \delta$.
$\Rightarrow$ $W_\phi \cap \mathcal{D}_K$ is open in $\mathcal{D}_K$ for all $K \subset \Omega$. $\Rightarrow$ $W_\phi \in \tau$.
Compare with P16, note.

$\mathcal{D}_K \cap (\phi + W_\phi) \ni \phi + \psi^{\in W_\phi}$ $\Rightarrow$ $\phi + \psi \in \mathcal{D}_K$, but since $\phi \in E \in \tau_K$ $\Rightarrow$ $\phi \in \mathcal{D}_K$. $\Rightarrow$ $\psi \in \mathcal{D}_K$. $\Rightarrow$ $\phi + \psi \in \phi + (\mathcal{D}_K \cap W_\phi)$
Converse is easier. Clearly $\phi + (\mathcal{D}_K \cap W_\phi) \subset E$, by (2). ⌋

If V is the union of these sets $\phi + W_\phi$, one for each $\phi \in E$, then V has the desired property.

⌈ $$V = \bigcup_{\phi \in E} (\phi + W_\phi) \quad \Rightarrow \quad V \cap \mathcal{D}_K = \left(\bigcup (\phi + W_\phi)\right) \cap \mathcal{D}_K$$

$$= \bigcup((\phi + W_\phi) \cap \mathcal{D}_K) = \bigcup \phi + (\mathcal{D}_K \cap W_\phi) \subset E$$
$\Rightarrow$ Since $V \supset E$, $E = V \cap \mathcal{D}_K$. ⌋

For (c), consider a set $E \subset \mathcal{D}(\Omega)$ which lies in no $\mathcal{D}_K$. Then there are functions $\phi_m \in E$ and there are distinct points $x_m \in \Omega$, without limit point in Ω, such that $\phi_m(x_m) \neq 0$ $(m = 1, 2, 3, \cdots)$.

⌈ For each N, $E \not\subset \mathcal{D}_{K_N}$. $\Rightarrow$ $\exists$ $\phi_N \in E$ s.t
supp $\phi_N \not\subset K_N$ $\Rightarrow$ $\exists$ a point $x_N \in \Omega$, s.t $\phi_N(x_N) \neq 0$,
$x_N \in K_N^c$. We may choose distinct points, and the points have no limit in Ω. If $\exists$ a limit point in Ω, the limit point is in the interior of some compact set K_{N_0}. $\Rightarrow$ $*$, since $\exists$ infinitely many x_N's. which is impossible. ⌋