Q5) Let σ is be field in the definition

A set of subsets of Ω, F is a σ field if :-

i) $\Omega \in F$

ii) F is closed under complement if $A \in F$, $A^c \in F$

iii) F is closed under unions if $A, B \in F$, $A \cup B \in F$

Given $\{a, v, c, d\} = \Omega$

Condition : $F_1 \subset F_2 \subset F_3 \subset F_4$

Let $F_1 := \{\cancel{\{\phi\}} \{\phi\}, \{\Omega\}\}$

Null set

Let $F_2 = \{\{\phi\}, \{\Omega\}, \{a\}, \{u, c, d\}\}$

Let $F_3 = \{\{\phi\}, \{\Omega\}, \{a\}, \{u, c, d\}, \{v\}, \{a, c, d\}, \{a, v\}\}$

Let $F_4 = \{\{\phi\}, \{\Omega\}, \{a\}, \{v\}, \{c\}, \{u, c, d\}, \{a, c, d\}, \{a, u, d\},$
$\{a, v\}, \{a, c\}, \{u, c\}\}$

We see that $F_1 \subset F_2 \subset F_3 \subset F_4$

It can be proven that F_1, F_2, F_3 and F_4 are all σ-fields satisfying the required conditions.