2 (a) Let F and G be two non-empty proper subsets of $\mathbb{R}$ such that F is closed and G is open. If $F\Delta G$ is both open and closed then show that $F^c = G$. [3]

(b) Let (X, d) be a metric space. If $x \in X$ then show that $\{x\}$ is closed. [3]

(c) Let $G = \{x \in \mathbb{R} \setminus \mathbb{Q} : x \leq 0\}$ and $F = \{x \in \mathbb{Q} : x \geq 0\}$. Show that [3+6]

(i) G is a G_δ set.

(ii) $F \cup G$ is neither F_σ nor G_δ