Question 1. [5 marks] SHORT ANSWERS

NOTE FOR PART (A)

See WS01Mon and PS1 for the concrete problems you worked on to develop your intuition for Sufficient and for Necessary, and WS02Wed "Necessary, and Sufficient" for a precise general discussion using the concepts formalized in WS01Wed and WS02Mon.
Let S_1, S_2, C, N_1, N_2 be predicates on D. Let $\mathcal{S}_1 = \{v \in D : S_1(v)\}$, etc.
S_1 and S_2 being sufficient for C, and N_1 and N_2 being necessary for C, mean:

$$\forall v \in D,\, S_1(v) \Rightarrow C(v) \;;\; \forall v \in D,\, S_2(v) \Rightarrow C(v) \;;\; \forall v \in D,\, C(v) \Rightarrow N_1(v) \;;\; \forall v \in D,\, C(v) \Rightarrow N_2(v)$$
$$\forall v \in \mathcal{S}_1,\, C(v) \;;\; \forall v \in \mathcal{S}_2,\, C(v) \;;\; \forall v \in \mathcal{C},\, N_1(v) \;;\; \forall v \in \mathcal{C},\, N_2(v)$$
$$\mathcal{S}_1 \subseteq \mathcal{C} \;;\; \mathcal{S}_2 \subseteq \mathcal{C} \;;\; \mathcal{C} \subseteq \mathcal{N}_1 \;;\; \mathcal{C} \subseteq \mathcal{N}_2$$

(as usual we're using notation to be precise and concise, but we're drawing those set relationships, at least on our mental whiteboards).
You've had a lot of practice with $S_1 \vee S_2$ being sufficient for C, and $N_1 \wedge N_2$ being necessary for C, which we can also state abstractly as:

$$\forall v \in D,\, (S_1(v) \vee S_2(v)) \Rightarrow C(v) \;;\; \forall v \in D,\, C(v) \Rightarrow (N_1(v) \wedge N_2(v))$$
$$\mathcal{S}_1 \cup \mathcal{S}_2 \subseteq \mathcal{C} \;;\; \mathcal{C} \subseteq \mathcal{N}_1 \cap \mathcal{N}_2$$