Problem Set : Week 14   Due : 5 pm on 19/11/25

① Prove the two claims from the notes of Lecture 21.   [4+4]

② Prove that $P \subseteq NP \cap co\text{-}NP \subseteq EXP$.   [5]

③ For languages A, B, C show that if $A \leq_p B$ and $B \leq_p C$, then $A \leq_p C$.   [2]

④ Let φ be a boolean formula in CNF.
  i) Show that $\neg \varphi$ is in DNF.
  ii) What can we say about the satisfiability of $\neg \varphi$ if a) φ is satisfiable?
                              b) φ is unsatisfiable?   [1+1+1]