Q.3) Consider a logical language consisting of n unary relation symbols $P_1, P_2, \ldots, P_n$ and the equality relation. Write a formula that is linear in n such that any model satisfying the formula is of size at least 2^n. (4)

Logic Quiz - 2

Q.1) Let X_1, X_2 be sets of sentences such that there is no model satisfying all the sentences in $X_1 \cup X_2$. Prove that there is a sentence ϕ such that all models of X_1 are also models of ϕ and all models of X_2 are also models of $\neg \phi$.   (3)

Q.2) Design a logical language (ie, a set of relation symbols, function symbols & constant symbols) & write an FO-formula in that language that uses no more than 3 variables with the following property : any model satisfying your formula must be infinite (ie the underlying universe must be infinite). Justify your answer with rigorous mathematical proof   (3)