Natural Language Processing

(a) The Figure below shows feature structures corresponding to lexical entries for *snores* and *he*.

These structures can be combined using a grammar rule to give a feature structure corresponding to the phrase *he snores* with a semantic structure equivalent to *pron(x) ∧ snore_v(x)*. Give this grammar rule as a feature structure and show the results of applying the rule to the structures in the Figure. [7 marks]

(b) Syntactically the verb *rains* takes the pleonastic pronoun *it* as subject but semantically it has no arguments. Give possible feature structures for *rains* and pleonastic *it*. Show how ungrammatical sentences such as *he rains* are avoided, mentioning any modifications to the lexical entries in the Figure that might be necessary. [6 marks]

(c) Selectional restrictions can be used to block parses of semantically anomalous sentences such as:

- The pebble snores.
- The pebble wrote a book.
- The dog wrote a book.

Describe how selectional restrictions might be encoded in a feature structure grammar. [7 marks]