10 Logic and Proof (lp15)

(a) List three significant differences between the DPLL method and resolution. [3 marks]

(b) To what extent is pure literal elimination applicable to (i) resolution theorem proving and (ii) Prolog? [3 marks]

(c) For each of the following sets of clauses, either exhibit a model or show that none exists using resolution. Note: $a$ and $b$ are constants, while $x$ and $y$ are variables.

(i) 
\[
\{P(a)\} \quad \{\neg P(x), M(x)\} \quad \{\neg P(x), L(x)\} \quad \{\neg Q(x), \neg P(x)\} \\
\{\neg L(x), \neg M(x), \neg R(x)\} \quad \{P(x), Q(x), P(b)\} \quad \{\neg P(x), Q(x), R(b)\}
\]

[7 marks]

(ii) 
\[
\{\neg P(x), Q(x, x)\} \quad \{\neg Q(x, y), \neg Q(y, x), R(x, y)\} \\
\{\neg R(x, y), \neg R(a, x)\} \quad \{P(a), P(b)\}
\]

[7 marks]