**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*)

$$\{P(a)\} \qquad \{\neg P(x), M(x)\} \qquad \{\neg P(x), L(x)\} \qquad \{\neg Q(x), \neg P(x)\}$$

$$\{\neg L(x), \neg M(x), \neg R(x)\} \qquad \{\neg P(x), Q(x), P(b)\} \qquad \{\neg P(x), Q(x), R(b)\}$$

[7 marks]

(*ii*)

$$\{\neg P(x), Q(x, x)\} \qquad \{\neg Q(x, y), \neg Q(y, x), R(x, y)\}$$
$$\{\neg R(x, y), \neg R(a, x)\} \qquad \{P(a), P(b)\}$$

[7 marks]