Comparative Programming Languages

Consider the Prolog procedures named \texttt{s} and \texttt{p} defined as follows:

\begin{verbatim}
\texttt{s(H, [H|T], T).}
\texttt{s(H, [N|T], [N|L]) :- s(H, T, L).}

\texttt{p(X, [H|T]) :- s(H, X, Z), p(Z, T).}
\texttt{p([], []).}
\end{verbatim}

(a) Show how Prolog would evaluate the goal \texttt{s(H, [a,b,c], T)} giving all the successive instantiations of \texttt{H} and \texttt{T} that cause the goal to be satisfied, and hence describe in words what \texttt{s} does. [6 marks]

(b) What value of \texttt{Q} causes the goal \texttt{p([a], Q)} to be satisfied? [3 marks]

(c) What values of \texttt{Q} cause the goal \texttt{p([a,b], Q)} to be satisfied? [4 marks]

(d) What values of \texttt{Q} cause the goal \texttt{p([a,b,c], Q)} to be satisfied? [5 marks]

(e) Describe in words what \texttt{p} does. [2 marks]