2005 Paper 3 Question 4

Comparative Programming Languages

Consider the Prolog procedures named s and p defined as follows:

```
s(H, [H|T], T).
s(H, [N|T], [N|L]) :- s(H, T, L).

p(X, [H|T]) :- s(H, X, Z), p(Z, T).
p([], []).
```

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

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

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

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

(e) Describe in words what p does.   [2 marks]