6 Two capacitors P and Q, each of capacitance *C*, are connected in series with a battery of e.m.f. 9.0 V, as shown in Fig. 6.1.

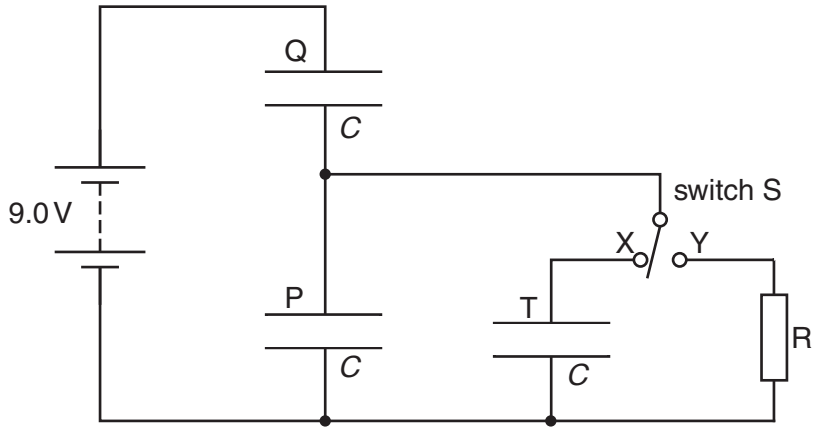

Fig. 6.1

A switch S is used to connect either a third capacitor T, also of capacitance *C*, or a resistor R, in parallel with capacitor P.

(a) Switch S is in position X.

Calculate

(i) the combined capacitance, in terms of *C*, of the three capacitors,

capacitance = ... [2]

(ii) the potential difference across capacitor Q. Explain your working.

potential difference = ... V [2]

(b) Switch S is now moved to position Y.
State what happens to the potential difference across capacitor P and across capacitor Q.

capacitor P: .....

.....

.....

capacitor Q: .....

.....

.....

[4]

[Total: 8]