OCR
Oxford Cambridge and RSA

A Level Physics A

H556/02 Exploring physics

Question Set 8

1(a) A capacitor of capacitance 7.2 pF consists of two parallel metal plates separated by an insulator of thickness 1.2 mm. The area of overlap between the plates is 4.0×10^{-4} m^2. Calculate the permittivity of the insulator between the capacitor plates.

permittivity = ... $F\,m^{-1}$ **[2]**

(b) Fig. 21 shows a circuit.

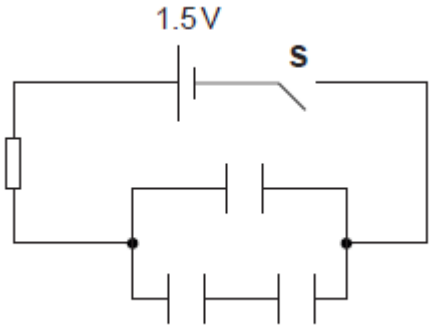

Fig. 21

The capacitance of each capacitor is 1000 μF. The resistance of the resistor is 10 kΩ. The cell has e.m.f. 1.5 V and negligible internal resistance.

(i) Calculate the total capacitance *C* in the circuit.

C = ... μF **[2]**

(ii) The switch **S** is closed at time $t = 0$. There is zero potential difference across the capacitors at $t = 0$.
Calculate the potential difference *V* across the resistor at time $t = 12$ s.

V = ... V **[2]**

Total Marks for Question Set 8: 6