

## **A level Physics B**

**H557/01** Fundamentals of physics

### **Question Set 8**

1. (a) A student makes an iterative model for the decay of charge on a capacitor. The time constant of the circuit is  $RC = 10$  s.

time lapsed /s	charge $Q$ on capacitor /C	charge $\Delta Q$ leaving capacitor in time interval $\Delta t = 1$ s /C	charge $Q$ remaining after time interval $\Delta t$ /C
$t$	$Q$	$\Delta Q \approx \frac{Q\Delta t}{RC}$	$Q = (Q - \Delta Q)$
0	5	$\frac{5 \times 1}{10} = 0.5$	$5 - 0.5 = 4.5$
1	4.5		

Complete the numerical values in the two blank cells in the table.

[2]

- (b) (i) Explain the physics behind the approximation in the third column of the table

$$\Delta Q \approx \frac{Q\Delta t}{RC}$$

[2]

- (ii) State the assumption made in using this approximation and explain how its effect can be made insignificant.

[2]

**Total Marks for Question Set: 6**

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