

## Physics

## PHY6T/P15/task

### Unit 6 Investigative and Practical Skills in A2 Physics

#### ISA (P) Capacitor Discharge

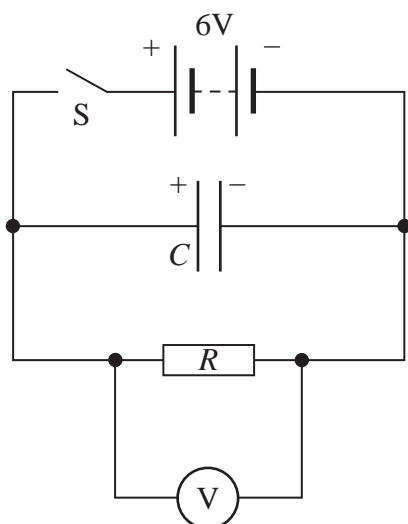
#### Task Sheet

This task is worth 7 marks

You are advised to read through these instructions before beginning your work.

You are going to investigate how long it takes for the potential difference (pd) across a charged capacitor to fall by two thirds when the capacitor is discharged through a resistor.

Figure 1



#### Useful formulae

Resistors in series  $R = R_1 + R_2$

Resistors in parallel  $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$

- Set up the circuit shown in **Figure 1** using two resistors connected in parallel that give the lowest possible value for  $R$ . If a switch  $S$  has not been provided you will be told how to disconnect your power source.
- **Before switching on you must ask your supervisor to check your circuit.**
- Close switch  $S$  and record the voltmeter reading  $V_0$ .
- Open  $S$  and observe that the voltmeter reading decreases as the capacitor discharges.
- Close  $S$ .
- Open  $S$  and start the clock at the same time.
- Record the time  $T_{\frac{1}{3}}$  for the voltmeter reading to fall to  $\frac{V_0}{3}$ .
- You are not required to record repeat readings.
- Repeat this experiment using two resistors which when combined provide the highest possible resistance.
- Obtain further readings until you have a total of six values of  $T_{\frac{1}{3}}$  corresponding to different values of  $R$ . Use only **one** or **two** resistors each time.
- Present all your results in a table.
- Plot a graph of  $T_{\frac{1}{3}}$  on the vertical axis against  $R$ . Draw a straight line of best fit.

Turn over ►

**After the Investigation**

At the end of the investigation, hand in all your written work, including the graph and recorded results, to the supervisor.

This documentation will be required for Stage 2 of the ISA. Ensure that you have entered your centre details, candidate number and name on all the sheets you have completed.