H

Higher Assignment  
Guide Sheet A: A.C. D.C.



**A.C. D.C relationship.**

**Apparatus**

2 identical lamps, variable D.C power supply, variable A.C power supply, oscilloscope, connecting wires, double pole switch or two circuits. Light level meter.

![A diagram of a light bulb

Description automatically generated]()

**Instructions:**

* Switch on the left hand lamp.
* Adjust the a.c. voltage to give a peak alternating voltage of 1 V
* Leave this circuit switched on.
* Switch on the right hand circuit.
* Adjust the d.c. voltage so that the lamp is the same brightness as the left hand lamp.
* Measure the deflection of the spot on the oscilloscope. This gives a measure of the direct voltage across the lamp.
* Alter the a.c. peak voltage.
* Plot a graph.
* State the relationship between V d.c. and V peak using the value obtained from the graph.

**Risk Assessment**

* The light bulbs will get very hot
* Do an electrical safety check by observing all the wires and connections.
* Do not leave the circuit on longer than necessary
* Be observant to those around you.

**Instructions**

* Teachers must exercise their professional responsibility to ensure that the report submitted is the candidate’s own work.
* No more than 8 hours should be spent on the whole assignment.
* A maximum of 2 hours is allowed for the report stage.
* The instructions for candidates outline the requirements for the assignment. must be given to candidates at the outset.
* Teachers must ensure candidates understand the requirements of the task.
* Teachers must not, at any stage, provide candidates with a template or model answers.

**Experimental research**

* Teachers can supply instructions for the experimental procedure(s).
  + This **must not** include details of range and interval of measurements, and reference to repeats.
* Teachers are responsible for ensuring that appropriate risk assessment has been carried out and that candidates have guidance on the safe and correct use of equipment.
* Teachers **must not** provide candidates with experimental data.
* Teachers **must not** provide a blank or pre-populated table for experimental results.
* Candidates must carry out the experimental work either individually or as part of a small group. (A small group is defined as having two, three or four candidates.)
* Group work may be an appropriate approach in a number of circumstances, for example:
  + to encourage diversity of research topic
  + where experiments are labour- or time-intensive
  + where resources are limited Where candidates work in a group, teachers must ensure every candidate participates in the experimental work.
  + Within the small group, it is acceptable for candidates to share experimental data, but experimental data must not be shared between groups.
* Teachers **must not** provide feedback to candidates on their data. However, where candidates identify a problem with their results and indicate that they wish to repeat the experiment(s), they may do so.

**Mrsphysics takes no responsibility for any health and safety. It is the responsibility of the teacher and student to risk assess any practical activity they complete! It is also the responsibilty of the teacher to check that these experiments meet the specifications. Mrsphysics has done her best to check that these meet the criteria**

* **Sept 2023**