**A Level Experiments**

The experiments listed below appear in the syllabus as “learners should be able to demonstrate their knowledge and understanding of the techniques and procedures used for ……”

In other words, these are the experiments that you have to know off by heart and experience has been shown that this type of long answer question is not well answered by the majority.

For each experiment you will need to know

* Apparatus: what instruments do you use?
* Method: what do you measure\*\*?
* Analysis: what do you do with the measurements when you have them?
* Reducing error: making your experiment precise, accurate and reliable
* Any health and safety considerations

\*\* don’t confuse the quantities that you measure with the quantities that you calculate. For example you don’t measure something’s area. You measure the dimensions and then you calculate the area.

*Remember you are allowed to use bullet points in your answers and you are likely to write a better answer if you do*

The experiments are split into modules and those that will be asked about in the Modelling Physics exam and those that will asked about in the Exploring Physics exam. The Unified Physics exam could include any of these practicals.

**General practical skills**

In addition to these experiments make sure you know the meanings of the terms:

* Independent variable
* Dependent variable
* Controlled variable
* Random error
* Systematic error
* Resolution
* Precision
* Accuracy
* Absolute uncertainty
* Percentage uncertainty

You will also need to know how to calculate both absolute and percentage uncertainty for experimental data including graphical data using lines of best and worst fit

**Modelling Physics**

**Module 3: Forces and motion**

1. Investigate the motion and collisions of objects (Spec ref: 3.1.2 aii) (PAG 1.3)
2. Finding g with trapdoor and electromagnet or light gates and timer. (Spec ref: 3.1.2 bii) (PAG 1.1)
3. Finding terminal velocity of an object in a fluid (Spec ref: 3.2.2 dii) (PAG 1.2)
4. Finding the centre of gravity for an object (Spec ref: 3.2.3 d)
5. Force-extension characteristic for a spring and other materials (Spec ref: 3.4.1 dii) (PAG 2.2 and 2.3)
6. Determining Young’s Modulus for a wire (Spec ref: 3.4.2 dii) (PAG 2.1)

**Module 5: Newtonian World and Astrophysics**

1. Demonstrating Brownian motion with smoke particles in air (Spec ref: 5.1.2 c).
2. To find specific heat capacity of a metal block and a liquid (Spec ref: 5.1.3 bii). (PAG 11.2)
3. To find specific latent heat of a solid and a liquid (Spec ref: 5.1.3 dii).
4. Investigating Boyles Law, Pressure-temperature relationship and estimating absolute zero (Spec ref: 5.1.4 dii).
5. Investigate circular motion using a whirling bung (Spec ref: 5.2.2 dii)
6. Determining period and frequency of SHM oscillations (Spec ref: 5.3.1 cii). (PAG 10.1)

**Exploring Physics**

**Module 4: Electrons, Waves and Photons**

1. Electrical characteristics of ohmic and non-ohmic devices (Spec ref: 4.2.3 cii)
2. Finding resistivity of a metal (Spec ref: 4.2.4 aii) (PAG 3.1)
3. Finding internal resistance and e.m.f. of a cell (Spec ref: 4.3.2 cii) (PAG 3.3)
4. Making a temperature and light dependent potential divider circuit (Spec ref: 4.3.3 cii) (PAG 4.3)
5. Using an oscilloscope to determine frequency and amplitude (Spec ref: 4.4.1 bii) (PAG 5.3)
6. Demonstrating reflection and refraction in a ripple tank (Spec ref: 4.4.1 fii)
7. Observing polarising effects with microwaves and light (Spec ref: 4.4.1 fiii) (PAG 6.3)
8. Finding the refractive index of glass with a rectangular glass block (Spec ref: 4.4.2 dii) (PAG 6.2)
9. Finding the critical angle for glass with a semi circular glass block (Spec ref: 4.4.2 dii) (PAG 6.2)
10. Observing superposition with sound, light and microwaves (Spec ref: 4.4.3 aii)
11. Finding the wavelength of light using a double slit and diffraction grating (Spec ref: 4.4.3 f,g) (PAG 5.1)
12. Finding the speed of sound by the formation of stationary waves in a resonance tube (Spec ref: 4.4.4 eii) (PAG 5.2)
13. Determining Plank’s constant using LEDs (Spec ref: 4.5.1 e) (PAG 6.1)
14. An experiment to demonstrate the photoelectric effect (Spec ref: 4.5.2 a)

**Module 6: Particles and Medical Physics**

1. Investigating capacitors in series and parallel (Spec ref: 6.1.1 eii) (PAG 9.2)
2. Investigating the charging and discharging of capacitors (Spec ref: 6.1.3 aii) (PAG 9.1)
3. To find flux density between poles of a magnet using a current balance (Spec ref: 6.3.1 eii)
4. To investigate flux density with a search coil (Spec ref: 6.3.3 dii)
5. To investigate transformers (Spec ref: 6.3.3 fii) (PAG 11.1)
6. Investigating absorption of alpha, beta and gamma radiation (Spec ref: 6.4.3 bii) (PAG 7.2)
7. Finding half life of protactinium (Spec ref: 6.4.3 eii) (PAG 7.3)
8. Simulation of radioactive decay with dice (Spec ref: 6.4.3 fii)