Getting Ready For
Physics

Your Name		
A Level Physics	Transition to A Level Physics	AQA

We are delighted you have chosen to study Physics at Worthing College.

Instructions: This pack will help you make the best possible start to studying this subject.

The tasks in this pack:

- should take you **about 4 hours to complete.**
- should be brought with you when teaching starts **from 9th September 2024** with your name on it for assessment.
- are also available on the internet – follow the links in the document.

If you need help: The tasks are designed to get a bit more difficult as you work through them as they are preparing you for studying at a higher level and to become an effective independent learner. You should try to get as far as you can working on your own but if you do need help, please email us at gettingreadyfor@worthing.ac.uk, telling us which Getting Ready For pack you are working on and what help you need. Help is available throughout the summer holidays.

Skills Focus for this Getting Ready for Pack	
Research sources of information Quality of written communication Clarity of mathematical communication	Organisation Linear learning

Work Experience week

All year 1 students are required to participate in a week-long work placement during their first year of study. You will be expected to locate one week's worth of work placement and submit your work experience form before October half term.

Placement Dates:

L2/L3 students on double /triple qualifications:	1 week course-specific placement, expected placement dates will be confirmed by the course leaders at the beginning of September.
Students with 2 or more single subjects:	1 week placement during the Easter holidays or w/c 23 June 2025

You can find the work experience form HERE
More information and guidance can be found HERE

Target Grade	Type of task	Task and subject specific skill reference	Deadline
All	Getting prepared	Organisation is the first step to success in Physics A level. Make sure you have the following things when you start in September: • Ring binder with dividers for each topic (there will be 4 in y12) • Scientific calculator • Maths set including protractor and 30cm ruler • Pens and pencils You will also need one of the textbooks listed on the next page.	**from 9th September 2024**
All	Linear learning	Linear Learning is the second step to success in A level Physics. It's important to continually revisit previous learning and practice the skills you have learned. Complete all the tasks in the booklet attached.	**from 9th September 2024**
All	Support	**YouTube:** Maths help: https://www.youtube.com/watch?v=9Y05pw9jH3Q&list=PLxHVbxhSvleS6TaN5EqyV0mu1W35t33KL Physics help: https://www.youtube.com/watch?v=WtPeQsEwEWA **Khan Academy:** Maths help: TLMaths - GCSE to A-Level Maths Bridging the Gap (google.com) Physics helphttps://www.khanaademy.org/science/ap- physics-1	**from 9th September 2024**
Notes:			

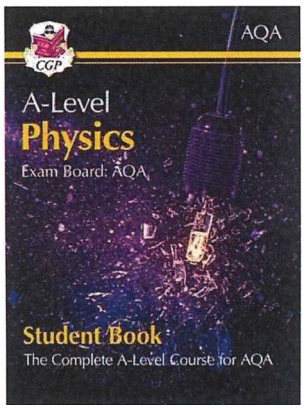
Preparing for A Level Physics

The most successful Physics students are those that are organised right from the start of the course! Here are some resources and equipment you might want to collect together ready for September.

Textbook

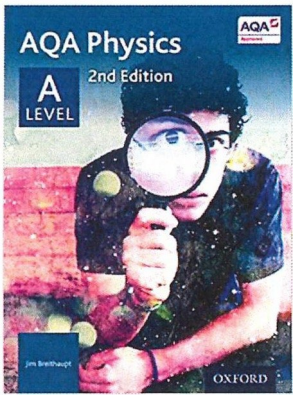
You will need to buy your own textbook to use in lesson and to complete your independent study at home. It doesn't matter what version you get but make sure it is AQA and published from 2016 onwards.

See below for some suggestions:



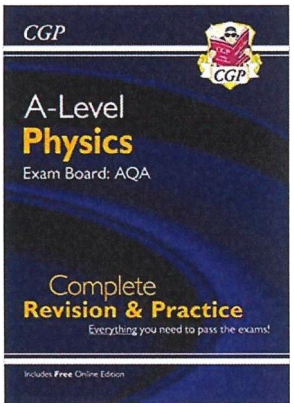
CGP AQA A-Level Physics

You could get either the Year 1 / AS version or the full 2-year A-Level version. It has good diagrams, concise information, and lots of summary questions.



OXFORD AQA Physics

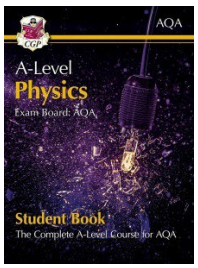
This also comes in a Year 1 / AS version or the 2-year version. It contains more detailed information and questions than the CGP version but also more expensive! This textbook is good if you are aiming for higher grades, B+.



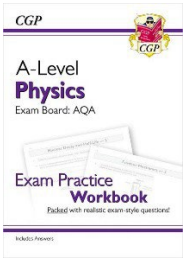
CGP AQA A-Level Physics revision guide

This doesn't really have enough detail or questions to have as your main textbook, but a lot of students like it as an additional resource for information to summarise notes and prepare for tests.

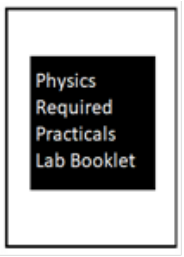
Physics A-Level Textbook Bundle



AQA: Year 1 & 2 Physics Student Book with Online Edition



AQA Physics Year 1 & 2 Exam Practice Workbook - includes Answers



Physics Required Practical Lab Booklet

Bundle cost £32

Available to buy from 26th August

RRP £55

Please note if you choose to purchase this bundle it will be given to you in your lessons at the start of the year.

How to purchase?

- • Go to the Worthing College website – click on Staff and Student Links, then scroll down to Online Store and click on Find Out More to access the store.

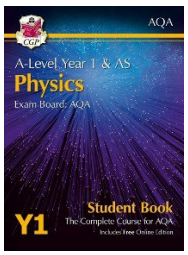
- If you have not used this service before, go to 'My account' and register an account

- When you fill in your details, please enter your student number or student name in the box marked 'student number' in the 'user details' section as this will enable us to track your purchase.

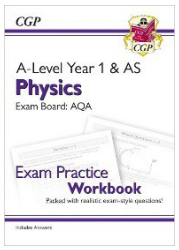
- Once registered in the shop navigate to product catalogue → worthing college →course materials the book bundle should be visible there. Once purchased you will then receive an email confirming your purchase, please retain your email invoice in case of problems. Your purchases will be given to you in your lesson.

- For those that get help with student funding once you have an account set up you will be able to email your receipt along with your name and student number to studentfinance@chigroup.ac.uk and you should be reimbursed.

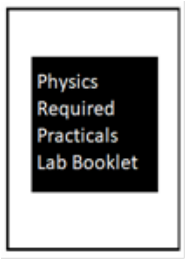
VIS Students Physics A-Level Textbook Bundle



AQA: Year 1 Physics Student Book with Online Edition



AQA Physics Year 1 Exam Practice Workbook - includes Answers



Physics Required Practical Lab Booklet

Bundle cost £20

Available to buy from 26th August

RRP £28

Please note if you choose to purchase this bundle it will be given to you in your lessons at the start of the year.

How to purchase?

- G• Go to the Worthing College website – click on Staff and Student Links, then scroll down to Online Store and click on Find Out More to access the store

- If you have not used this service before, go to 'My account' and register an account

- When you fill in your details, please enter your student number or student name in the box marked 'student number' in the 'user details' section as this will enable us to track your purchase.

- Once registered in the shop navigate to product catalogue → worthing college →course materials the book bundle should be visible there. Once purchased you will then receive an email confirming your purchase, please retain your email invoice in case of problems. Your purchases will be given to you in your lesson.

- For those that get help with student funding once you have an account set up you will be able to email your receipt along with your name and student number to studentfinance@chigroup.ac.uk and you should be reimbursed.

Other equipment:

Pens, pencils, highlighter etc...

Scientific calculator
The one you used at GCSE is fine for A-Level Physics.

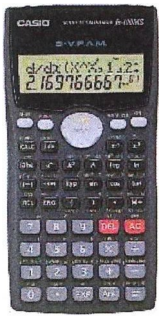
Maths set
Including ruler, protractor etc.

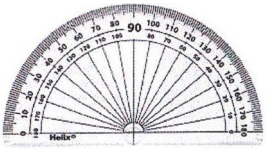
A4 folder
Most students get a smaller one to bring into college every day and a lever arch one to store notes from past topics at home.

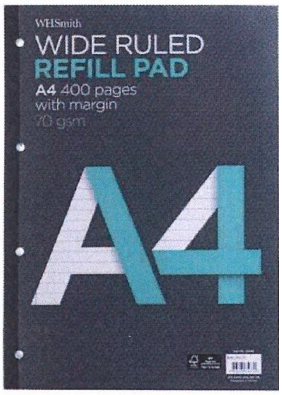
A4 paper
Loose paper is better than a notebook as you will need to file pages in different places and add to your lesson notes during independent study. Bringing a notebook to lesson also means you are unlikely to bring a folder, and you'll need a folder to store handouts, worksheets and topic tests.

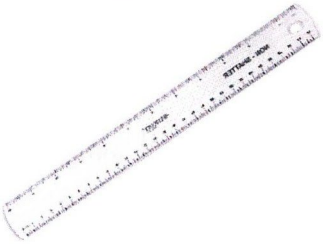
Dividers
Useful to separate your notes into topics.

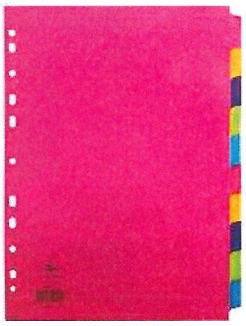
Phone/ iPad
We will use online resources in lessons, and you will submit work online so access to the internet in lesson is useful. Please don't worry if you can't, we have laptops that you can use in class if needed.











Pre-Knowledge Topics

A level Physics will use your knowledge from GCSE and build on this to help you understand new and more demanding ideas. Complete the following tasks to make sure your knowledge is up to date and you are ready to start studying:

Symbols and Prefixes

Prefix	Symbol	Power of ten
Nano	n	**x 10^{-9}**
Micro	μ	**x 10^{-6}**
Milli	m	**x 10^{-3}**
Centi	c	**x 10^{-2}**
Kilo	k	**x 10^{3}**
Mega	M	**x 10^{6}**
Giga	**G**	**x 10^{9}**

At A level, unlike GCSE, you need to remember all symbols, units and prefixes. Below is a list of quantities you may have already come across and will be using during your A level course.

Quantity	Symbol	Unit
Velocity	v	**ms^{-1}**
Acceleration	a	**ms^{-2}**
Time	t	**S**
Force	F	**N**
Resistance	R	**Ω**
Potential difference	V	**V**
Current	I	**A**
Energy	E or W	**J**
Pressure	P	**Pa**
Momentum	p	**$kgms^{-1}$**
Power	P	**W**
Density	ρ	**kgm^{-3}**
Charge	**Q**	**C**

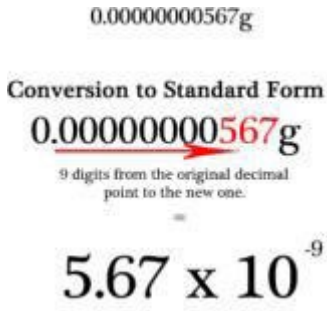
Task: Solve the following:

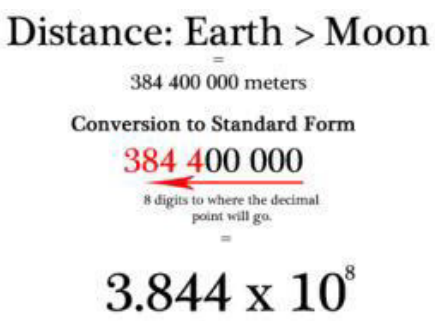
1. How many metres in 2.4 km?
2. How many joules in 8.1 MJ?
3. Convert 326 GW into W.

4. Convert 54 600 mm into m.
5. How many grams in 240 kg?
6. Convert 0.18 nm into m.
7. Convert 632 nm into m. Express in standard form.
8. Convert 1002 mV into V. Express in standard form.
9. How many eV in 0.511 MeV? Express in standard form.
10. How many m in 11 km? Express in standard form.

Standard Form

At A level, quantities will be written in standard form and it is expected that your answers will be too.





https://revisionmaths.com/gcse-maths-revision/number/standard-form#:~:text=Standard%20form%20is%20a%20way,be%20written%20in%20standard%20form

This means answers should be written as ….x 10^{y}. E.g. for an answer of 1200kg we would write 1.2 x 10^{3}kg.

Task: Complete the following problems;

1. Write 2530 in standard form.
2. Write 280 in standard form.
3. Write 0.77 in standard form.
4. Write 0.0091 in standard form.
5. Write 1 872 000 in standard form.
6. Write 12.2 in standard form.
7. Write 2.4 x 10^{2} as a normal number.
8. Write 3.505 x 10^{1} as a normal number.
9. Write 8.31 x 10^{6} as a normal number.
10. Write 6.002 x 10^{2} as a normal number.
11. Write 1.5 x 10^{-4} as a normal number.
12. Write 4.3 x 10^{3} as a normal number.

Rearranging Formulae

This is something you will have done at GCSE and it is crucial you master it for success at A level. For a recap of GCSE watch the following links:

www.khanacademy.org/math/algebra/one-variable-linear-equations/old-school-equations/v/solving-for-a-variable

www.youtube.com/watch?v=_WWgc3ABSj4

Task: Rearrange the following:

1. E=m x g x h to find h
2. Q= I x t to find I
3. E = ½ m v^2 to find m
4. E = ½ m v^2 to find v
5. v = u + at to find u
6. v = u + at to find a
7. $v^2 = u^2 + 2as$ to find s
8. $v^2 = u^2 + 2as$ to find u

Significant Figures

At A level you will be expected to use an appropriate number of significant figures in your answers. The number of significant figures you should use is the same as the number of significant figures in the data you are given. You can never be more precise than the data you are given so if that is given to 3 significant your answer should be too. E.g. Distance = 8.24m, time = 1.23s therefore speed = 6.75m/s

The website below summarises the rules and how to round correctly.

http://www.purplemath.com/modules/rounding2.htm

Task: Give the following to 3 significant figures:

1. 3.4527
2. 40.691
3. 0.838991
4. 1.0247

Calculate the following to a suitable number of significant figures:

1. 63.2 ÷78.1 =
2. 39 + 78 + 120 =
3. (3.4+3.7+3.2) ÷3 =
4. 0.0256 x 0.129 =

Atomic Structure

You will study nuclear decay in more detail at A level covering the topics of radioactivity and particle physics. In order to explain what happens you need to have a good understanding of the model of the atom. You need to know what the atom is made up of, relative charges and masses and how sub atomic particles are arranged.

The following video explains how the current model was discovered www.youtube.com/watch?v=wzALbzTdnc8

Task: Describe the model used for the structure of an atom including details of the individual particles that make up an atom and the relative charges and masses of these particles. You may wish to include a diagram and explain how this model was discovered by Rutherford.

Recording Data

Whilst carrying out a practical activity you need to write all your raw results into a table. Don't wait until the end, discard anomalies and then write it up in neat.
Tables should have column heading and units in this format quantity/unit e.g. length /mm
All results in a column should have the same precision and if you have repeated the experiment you should calculate a mean to the same precision as the data.

Below are link to practical handbooks so you can familiarise yourself with expectations.

https://filestore.aqa.org.uk/resources/physics/AQA-7407-7408-PHBK.PDF

Below is a table of results from an experiment where a ball was rolled down a ramp of different lengths. A ruler and stop clock were used.

Task: Identify the errors the student has made.

	Time			
Length/cm	**Trial 1**	**Trial 2**	**Trial 3**	**Mean**
10	1.45	1.48	1.46	1.463
22	2.78	2.72	2.74	2.747
30	4.05	4.01	4.03	4.03
41	5.46	5.47	5.46	5.463
51	7.02	6.96	6.98	6.98
65	8.24	9.68	8.24	8.72
70	9.01	9.02	9.0	9.01

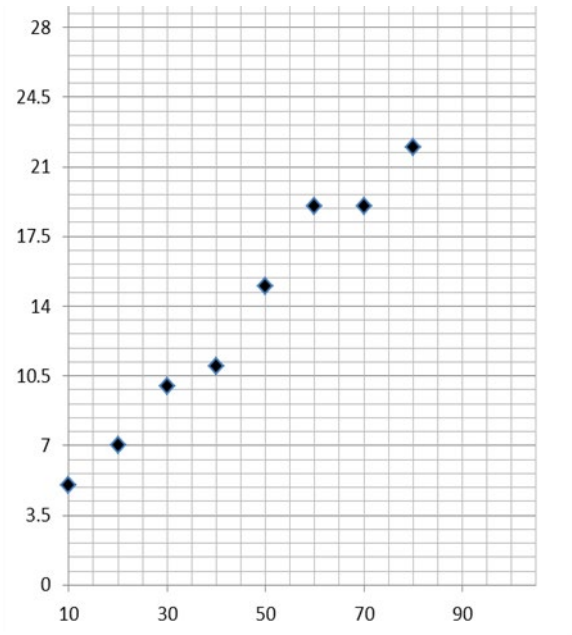
Graphs

After a practical activity the next step is to draw a graph that will be useful to you. Drawing a graph is a skill you should be familiar with already but you need to be extremely vigilant at A level. Before you draw your graph to need to identify a suitable scale to draw taking the following into consideration:

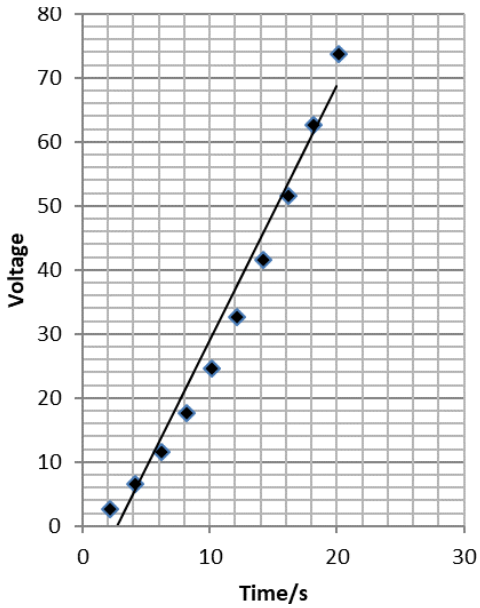
- the maximum and minimum values of each variable
- whether 0.0 should be included as a data point; graphs don't need to show the origin, a false origin can be used if your data doesn't start near zero.
- the plots should cover at least half of the grid supplied for the graph.
- the axes should use a sensible scale e.g. multiples of 1,2, 5 etc)

Identify how the following graphs could be improved

Graph 1



Graph 2



Forces and Motion

At GCSE you studied forces and motion and at A level you will explore this topic in more detail so it is essential you have a good understanding of the content covered at GCSE. You will be expected to describe, explain and carry calculations concerning the motion of objects. The websites below cover Newton's laws of motion and have links to these in action.

http://www.physicsclassroom.com/Physics-Tutorial/Newton-s-Laws

Task: On graph paper sketch a velocity-time graph showing the journey of a skydiver after leaving the plane to reaching the ground. Mark on terminal velocity.

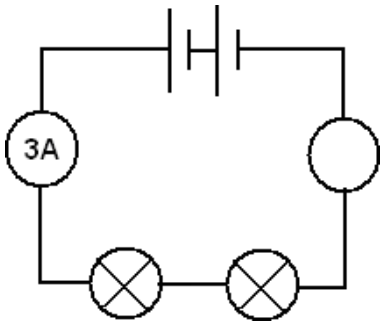
Electricity

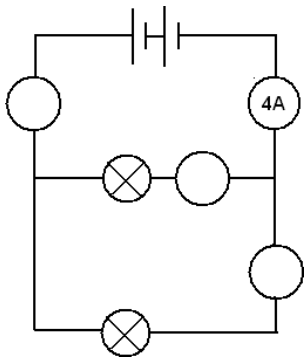
At A level you will learn more about how current and voltage behave in different circuits containing different components. You should be familiar with current and voltage rules in a series and parallel circuit as well as calculating the resistance of a device.

http://www.allaboutcircuits.com/textbook/direct-current/chpt-1/electric-circuits/
http://www.physicsclassroom.com/class/circuits

Task:

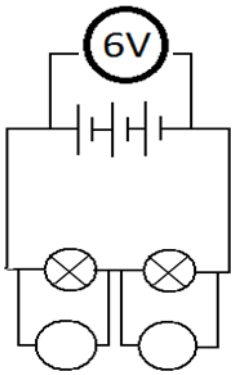
1a) Add the missing ammeter readings on the circuits below.

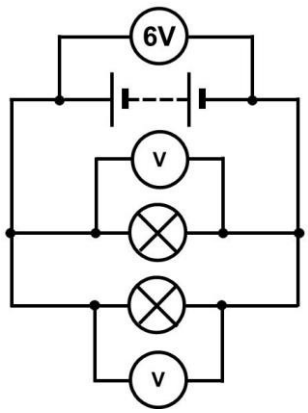




b) Explain why the second circuit has more current flowing than the first.

2) Add the missing potential differences to the following circuits





Waves

You have studied different types of waves and used the wave equation to calculate speed, frequency and wavelength. You will also have studied reflection and refraction.

Use the following links to review this topic.

https://www.khanacademy.org/science/physics/mechanical-waves-and-sound/mechanical-waves/v/introduction-to-waves

1) Draw a diagram showing the refraction of a wave through a rectangular glass block. Explain why the ray of light takes this path.

2) Describe the difference between longitudinal and transverse waves and give an example of each.

3) Draw a wave and label the wavelength and amplitude.

A Level Physics Transition Baseline Assessment

The following 40 minute test is designed to test your recall, analysis and evaluative skills and knowledge.
Remember to use your exam technique: look at the command words and the number of marks each question is worth.

A single piece of graph paper is required for the completion of the assessment.
You may use a calculator.

Question Number	Topic	Score
1	Symbols and Prefixes	/3
2	Standard Form	/4
3	Re-arranging Equations	/3
4	Atomic Structure	/3
5	Recording Data	/3
6	Graphing	/4
7	Forces and Motion	/10
8	Electrical Circuits	/5
		Total /35

Q1 Complete the following table:

Unit prefix	Meaning
k (kilo)	x 1000
	X 0.000001
M (mega)	
N (nano)	

[3]

Q2

a) Write the following numbers into standard form.

i. 0.012

ii. 120000

iii. 0.00000012

[3]

b) Complete the following calculations and write your answers to an appropriate number of significant figures.

i. 2.1 X 0.15

ii. 0.345 ÷ 0.114

[4]

Q3 Re-arrange the following equations to make R the subject of the equation.

a) $\boldsymbol{Q = WERTY}$

b) $\boldsymbol{Q^2 = WR^2}$

c) $\boldsymbol{Q = W - RT^2}$

[3]

Q4

a) Name the 3 particles (from GCSE) that make up an atom.

b) Which one of the above particles is not found in the nucleus of an atom?

c) Which of the above particles will be found in varying quantities in the nuclei of isotopes of the same element?

Q5

a) Complete the following table

Voltage (__)	_____(A)		
	Repeat 1	Repeat 2	Average
2	0.23	0.26	0.25
4	0.46	0.53	
6	0.69	0.78	0.74
8	0.92	1.04	0.98
10	1.15	1.30	1.23

[3]

Q6

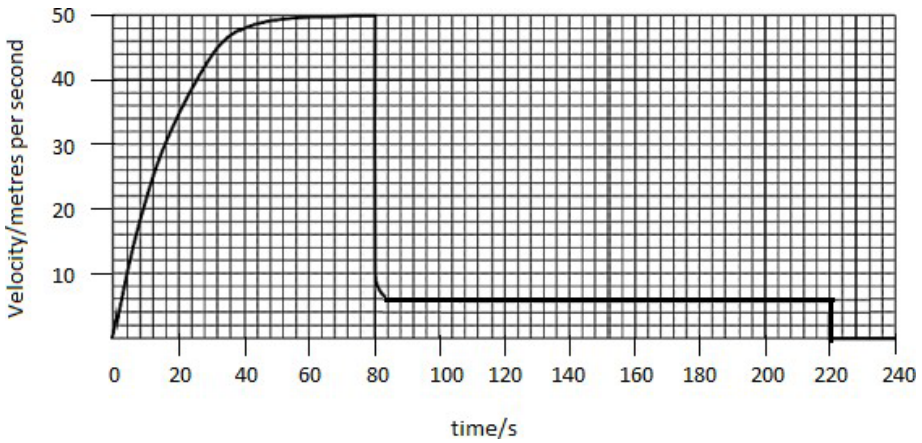
a) Use the graph paper on the next page to plot a graph of Current (x-axis) against Voltage (y-axis) drawing a line of best fit through your data points.

[4]

b) Find the gradient of your line of best fit

[3]

Q7 The graph below shows the journey of a skydiver after they have left the plane.



a) Explain the shape of the graph commenting on how and why the forces have changed.

[6]

b) Calculate the distance travelled whilst at the second terminal velocity.

[2]

c) Calculate the **average** acceleration in the first 20 seconds.

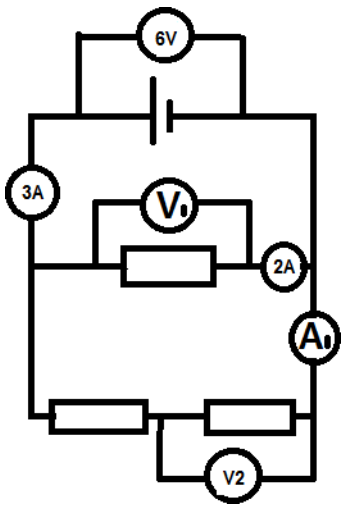
[2]

Q8

a) Draw a circuit diagram to show how the resistance of a filament bulb could be measured using an ammeter and a voltmeter.

[2]

b) Look at the circuit diagram below. All of the resistors are identical.



Write the missing values of current and potential difference:

i. V1 =
ii. V2 =
iii. A1 =

[3]