GOOD LUCK

MAKE SURE YOU FAIL SO THE GRADE

BOUNDARIES WILL BE LOW.

Feel free to add and edit as you wish.

google community, join for g483/4
https://plus.google.com/u/0/communities/109763924090495900638
Also on this community there will be a google + hangout at 19:00 BST 4th June for G482 Final revision.

is noone else NOT revising? i feel sick. ← double negative

Long Answer Questions and Answers:

For 60 W of a 230 v the current is 0.26 Amp whilst for a 40W of 230V is 0.17A so there for the 60w is thicker because the there is more current flowing through. and the resistance of 60W is 884 ohms whilst the 40W is 1353 which is higher resistance so therefore smaller R so larger area

larger power needs larger I	**B1**	**accept** $P = V^2/R$ **or** calculation I = 0.26 A
so smaller R (for same V)	**B1**	giving R = 880 or 890 Ω NB if R calculated correctly here, give first 2 marks
smaller R (but same length) so larger A / thicker	**B1**	hence smaller R (but same length) so larger A / thicker

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Question			Answer	Marks	Guidance
3	(a)		R <u>of thermistor</u> decreases as temperature increases	B1	**accept** more free e's as temperature rises
A			supply V is constant/ <u>total</u> R is smaller	B1	using I = nAev
A			current increases <u>as V = IR</u>/AW	B1	current increases as v decrease very small/AW
A					

as temperature increases current increases the resistance of the thermistor decreases voltage supplied stays constant

3 Fig. 3.1 shows how the resistance of a thermistor varies with temperature.

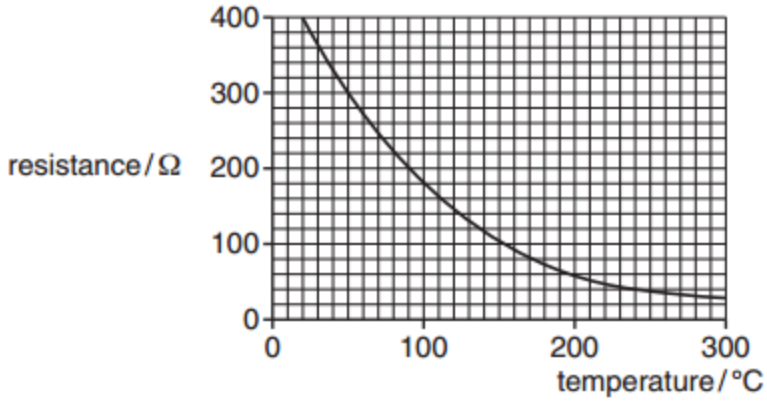

Fig. 3.1

The thermistor is used in the potential divider circuit of Fig. 3.2 to monitor the temperature of an oven. The 6.0 V d.c. supply has zero internal resistance and the voltmeter has infinite resistance.

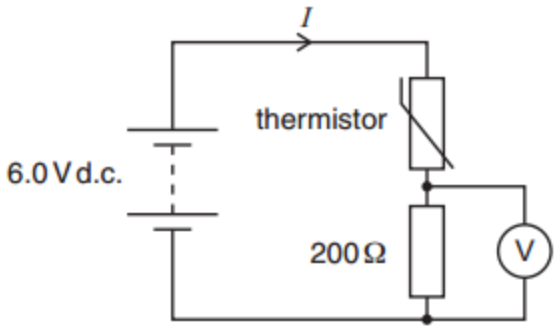

Fig. 3.2

(a) State and explain how the current I in the circuit changes as the thermistor is heated.

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..... **[3]**

(a) Define the following terms as applied to wave motion

(i) *displacement* and *amplitude*

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..... **[2]**

(ii) *frequency* and *phase difference*.

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..... **[2]**

Question			Answer	Marks	Guidance
6	(a)	(i)	*displacement :* (any) distance moved from equilibrium of a point/particle on a wave *amplitude* maximum displacement (caused by wave motion)	**B1** **B1**	**allow** rest, zero, mean position
	(a)	(ii)	*frequency* number of wavelengths passing a point /vibrations at a point per unit time/second or produced by the wave source /AW	**B1**	**allow** number of oscillations / cycles per second **accept** in one second
			phase difference between two points on the same wave/waves of the same frequency, how far through the cycle one point is compared to the other	**B1**	**allow** suitable descriptions of in phase and out of phase; **or** an angular measurement of how much a wave leads or lags/AW

(b) Fig. 2.2 shows the I–V characteristics of two electrical components, a resistor, line **R** and a thermistor, line **T**.

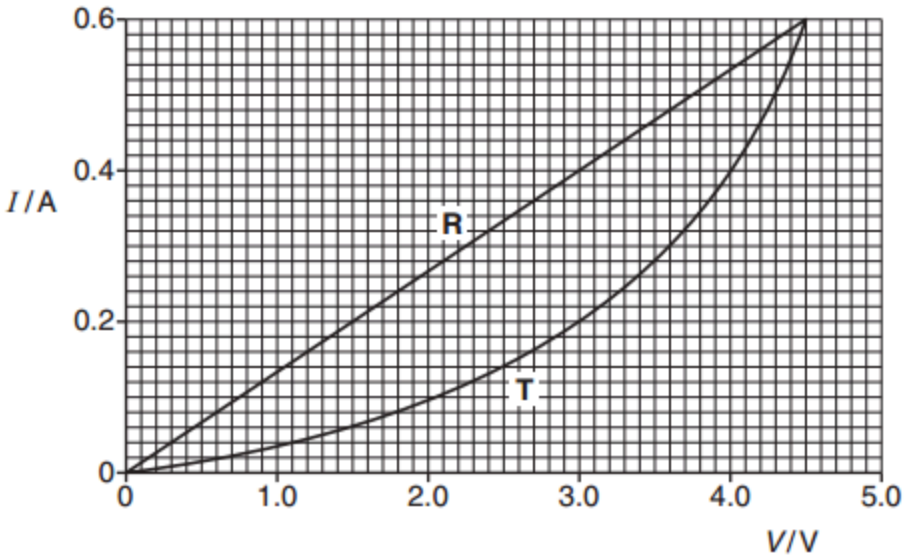

Fig. 2.2

(i) State Ohm's law. Use Fig. 2.2 to explain why component **R** obeys Ohm's law.

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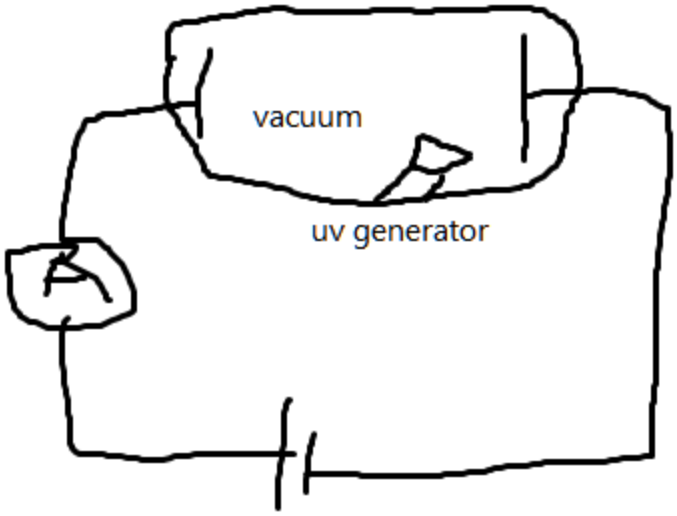
..... **[3]**

The two most important points you should make regarding graphs and Ohm's law is:
1) Whether the graph goes through the origin
2) Whether the graph has a linear region/ straight region relating to I is directly proportional to V.
3) And of course stating that temperature is constant.

(i)	**p.d./voltage must be proportional to current** as long as temperature and/or (other) physical conditions remain constant **R** line is straight and <u>through the origin</u>

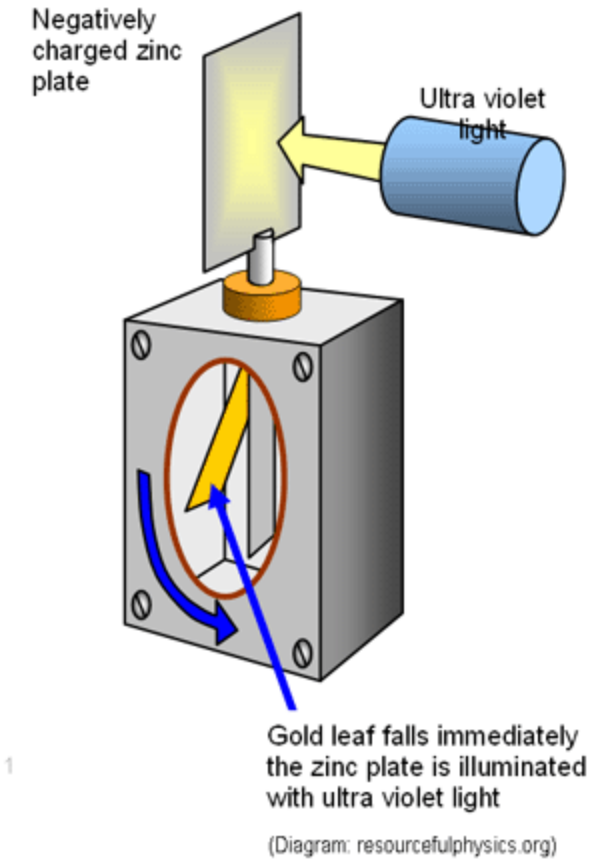
Q.How do you prove the photoelectric effect? [4]

firstly set up this circuit:



you should then observe a current flowing through the ammeter (galvanometer, very sensitive ammeter), which means that the UV light is causing electrons to be emitted from the metal plate at the end of the wire, which are then travelling through the vacuum as photoelectrons to the other metal plate where they're entering the circuit, generating a current. This proves the photoelectric effect because electrons are being emitted as a direct result of the UV radiation.

You could also prove the photoelectric effect using the gold leaf experiment



A (clean) **zinc** plate mounted on the cap of a gold-leaf electroscope.
Plate initially charged negatively
A **u-v lamp shining on plate**
The gold leaf collapses as the charge leaks away from the plate (when ultra-violet light is incident on the zinc plate)
so experiment indicates the emission of negative charge/electrons

Q.How do you show wave polarisation? [4]

Firstly you should set up the apparatus of a lamp emitting visible light and two polarising lenses, you should then place one polarising lens in front of the lamp and another one in front of that, once you have done that you should switch on the light and measure the intensity of the light leaving the lamp (HOW?) , then you should determine the angle using a protractor between the polarising lenses and use the equation $I = I_0 \cos^2 \theta_i$, to confirm that the polarisation is occurring.

I don't think we need to mention the angle, we can just place two polaroids in front of each other and rotate one until the intensity is nothing (then mention how this is because cos(90) is 0) to prove that polarisation is occurring.

i recall from the mark scheme you had to mention malus law.
And what each component in the formula for Malus's law represents... I think. ← yes you do.

it's alright, an easy way to understand it all is that current is a measure of how many little balls (electrons) are flowing through a wire, more of them will cause more friction which slows them down because atoms are flying everywhere and hitting the balls and stopping them (which is resistance)

And so the reason that resistance increases with temperature is because the more energy (in this form, heat energy) provided to the atoms, the more energy they have to 'fly everywhere' and prevent the flow of electrons (current) :)

a mistake i used to make in past papers would be explaining this resistance cause and losing marks because i was going too far in depth! when it comes to questions like that, keep it simple, most marks are from quoting formula, such as v=ir can be r=v/i showing that resistance increases as current decreases!

I think the trick with doing well in these papers is to just state the obvious as much as you can. I always find myself losing marks by waffling when really the answer is right in front of your face. -_- totally agree.

the formula booklet is a godsend, so many answers can be derived from it.

UV-A - 315-400nm, causes skin to tan.

UV-B - 315-260nm - causes cancer and burning of the skin, sunblock is used to filter this.

UV-C - 100-260nm - Filtered out by the Earth's atmosphere and does not reach the surface.

Work Function - The minimum energy needed for an electron to escape the metal surface.

Threshold Frequency - The minimum frequency required to emit a photoelectron from a metal surface

Diffraction - The spreading of wavefronts as they pass through an aperture, or around an obstacle

Phase difference - Phase difference between two points on waves of the same frequency is how far through the cycle one point is compared to the other.
or: Difference in distance of which one wave leads or lags another, measured in radians.

Path Difference - The difference in distance travelled by two waves from their source meeting at a point, measured in wavelengths [I hope this is correct, otherwise I need to learn a better definition]

Define Wavelength!

The distance between two identical points on a wave e.g. trough to trough or peak to peak

I would say: the distance between two identical neighbouring points on a wave.

Oh, REMEMBER TO READ THE QUESTION CAREFULLY. Underline what they're asking for!

agreed, i think everyone loses the most marks on wordy ones, maths ones are so easy once you understand the formula booklet!

Can this be the experiment area please. (know no experiments can someone supply me with model answers.. thanks!!!!!! EDIT: I DO NOW :D thx guize)
Photoelectic Effect
Light Polarisation
Young's Double Slit
Diffraction Grating

Standing wave experiments *both wave types (longitudinal+transverse) can produce standing waves.*
to set up a standing wave you can use a **microwave** and a **metal sheet**,

1) place the metal sheet some distance away from the microwave, exactly n or n.5 wavelengths away from the generator
2) microwaves will travel to the metal sheet and be reflected back upon themselves and travel in the opposite direction where they will superpose/interfere to create points of displacement equal to the amplitude [antinodes], and no displacement [nodes]. In this wave type energy is trapped in pockets and no energy is transferred, unlike a normal progressive wave.
3) measure the points of node and antinode using a microwave detector and moving it along the wave, you should detect points of zero amplitude meaning you have found a node, if you continue along it you should find a point of maximum displacement (a.k.a. amplitude), the distance between these points is (wavelength/4) from which you can determine the wavelength of the microwave.

Measuring the speed of sound using an air column.
firstly you will need a tuning fork of known frequency, then you need to determine the wavelength, before using v=fx(wavelength), to determine the wavelength you can set up a standing wave in a air colum, this consists of a column of water where you should clang the fork until you hear it resonate and add the water until you reach the fundamental frequency which is where the water cannot be any higher to produce a resonant sound, from this you can determine the wavelength as the length of the tube at this frequency is ¼(wavelength) but you need to add a constant called end correction because the node forms slightly above the water!

Youngs Double Slit
1) COHERENT light from the same source (constant phase difference)
2) 2 parallel narrow slits in an obstacle, a screen behind them
3) Light from the source passes through both slits and is diffracted
4) Interference occurs between the light from each slit at the screen
5) if waves arrive with a path difference of a multiple of whole wavelengths (n*lamda), cons interference - maxima , Arrive with a path difference of an odd multiple of half wavelengths ((n+1)/2 * lamda), destructive interference= minima

Describe an experiment to measure and obtain the Planck Constant, mentioning apparatus used and methods implemented

When an LED emits light, each electron that passes through it loses a fixed amount of energy: this energy corresponds to the energy of the emitted light. Therefore the energy lost by the electron = charge on electron x potential difference across LED. So **hf=eV** . The frequency of the LED light is **known** (manufacturers label). Setting up a circuit using an LED; a variable p.d supply is connected to the LED and increased from 0 until the LED begins to glow. The potential difference is measured for several different coloured LEDs. A graph of *eV* against frequency *f* is then plotted and the gradient of the graph is *h*.

CGP AS-Level Physics Revision Guide OCR A Exam Board

Charge Current and Potential Difference

Revision Notes:

1. Current is rate of flow of charge
2. Q=It
3. e=1.6x10^-19
4. Drift Velocity = Average velocity of the electrons
5. I=nave or I=navq << I= current n= number of charge carriers per m^3 a = cross sectional area and v= drift velocity
6. q or e=1.6x10^-19
7. Potential difference is the total energy transferred per unit charge when electrical energy is converted into another form of energy
8. number of electrons in 1 coulomb = $1/1.6*10^{-19} = 6.25*10^{18}$

Practice Questions (fairly easy, they are more like warm up questions)

1. Describe in words how current and charge are related

2. Define the Coulomb

3. What is drift velocity

4. Define Potential difference

Exam Questions

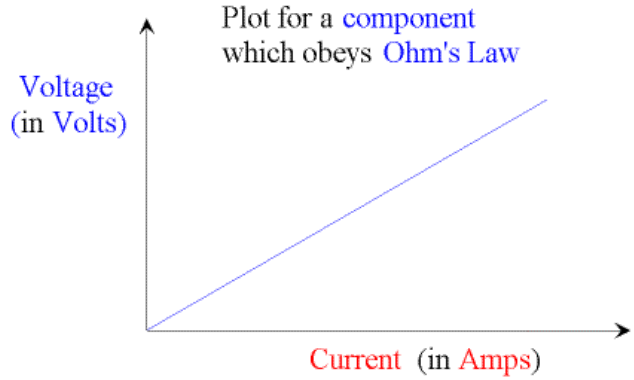
1. A battery delivers 4500C of charge to a circuit in 10 mins. Calculate average current. [2 Marks]

2. Copper has 1x10^29 free electrons per m^3. Calculate drift velocity of the electrons in a copper wire of cross sectional area 5x10^-6 m^2 when it is carrying a current of 13 A (e=1.6x10^-19C) [3 Marks]

3. An electric motor runs off a 12v DC supply and has efficiency 75%. Calculate how much electric charge will pass through the motor when it does 90J of work. [3 Marks]

Resistance and Resistivity

Revision notes:
1. Everything has resistance , if you put a PD across an electrical component, a current **will** flow
2. How much current flows depends on its resistance
3. You can think of a components resistance as a measure of how difficult it is to get a current to flow through it.
4. R=V/I
5. Resistance is measured in ohms
6. An electrical current will have a resistance of 1 ohm if a PD of 1V makes a current of 1 A
7. Three things affect resistance. These are Length (l), Area (A) and Resistivity (p)
8. The longer length the harder it is for current to flow = higher resistance
9. The wider the wire or larger area means it is easier for electrons to pass through = lower resistance
10. Resistivity depends on a material. A higher resistivity will make it harder for electrons to pass through = higher resistance. Remember resistivity depends on environmental factors as well, such as **temperature** and **light intensity**
11. For an ohmic conductor R is a constant
12. A chap called Ohm did most of the early work on resistance. He developed a rule to predict how the current would change as the applied potential difference increased, for certain types of conductor.. This rule is now called Ohm's law
13. Ohms law = Provided the temperature is constant, the current through a conductor is directly proportional to the potential difference across it.



(This graph can have Voltage in x-axis and current can be in y-axis and vice versa)

Practice Questions

1. Name one environmental factor likely to alter resistance of a component.

temperature?
Correct! 1 mark lol.yay!
2. What is special about an ohmic conductor?
the resistance is constant? uhh let me check back of book lol okay thanks :D They dont do anwsers for the practice questions :L ony constant if the temp is constant, important to mention! yess thanks for reminding me haha.. i see. okie sounds right though

Answers are in the notes above! Courtesy of Jamie oh yeah, we should sush. ;)
Yeah guys the anwsers are likely to be there because its the same pages and thequestions are from those pages lol truethat! ikr
3. What three factors does the resistance of a length of wire depend on?
It's width
It's temperature
4. What are the units for resistivity?

Exam Questions

1. Aluminium has a resistivity of 2.8x10^-8 ohm metres at 20 degrees celsius. Calculate the resistance of a pure aluminium wire of length 4m and diamoeter 1mm at 20 degrees celsius [3 Marks]

2. The table below shows some measurements taken by a student during an experiment investigating an unknown electrical component

Potential Difference (V)	**Current (mA)**
2.0	**2.67**
7.0	**9.33**
11.0	**14.67**

a) Use the first row of the table to calculate the resistance of the component when a p.d. of 2V is applied [2 marks]

b) By means of further calculations, or otherwise, decide whether this component is an ohmic conductor. [3 Marks]

I/V characteristics

Revision notes:

1. I/V graphs show how resistance varies.
2. I/V charachteristics refer to a graph which shows how the current flowing through a component changes as the PD across it is increased.
3. THe shallower the gradient of a charachteristic I/V graph, the greater the resistance of the component.
4. The I/V charachteristics of a metallic conductor is a straight line
5. At constant temperature, the current through a metallic conductor is directly proportional to the voltage.
6. The temperature affects charge carriers.
7. Charge is carried by free electrons in a lattice of positive ions.
8. The resistance of most metallic conductors goes up linearly with temperature.
9. Semiconductors are used in sensors because they allow more charge carriers to be released if energy is suplied to it.This makes them excellent for detecting changes inthe environment.
10. The resistance of a THermistor depends on temperature.
11. The resistance of an LDR depends on Light intensity.
12. Diodes only allow current to flow in one direction

Practice Questions
1. Sketch the circuit used to determine the I/V characteristics of a component

(sketch anwser using paint or something like that and upload the image here using Insert>Image above)

2. Draw an I/V charachterisitcs graph for a diode
(sketch anwser using paint or something like that and upload the image here using Insert>Image above)

3. What is an LDR?

4. If an I/V graph is curved,what does this tell you about its resistance?

Exam Question

Sorry guys just 1 exam question on this page :(

1. a) sketch the I/V charachteristic graph for a filament lamp [1 Mark]
b) state how the resistance changes as the temperature increases. [1 Mark]
c) Why does this happen? [2 marks]

“Describe, in terms of vibrations, the difference between a Transverse and a Longitudinal Wave. Give one example of each.”

Transverse - A wave where the vibration of particles is perpendicular to the direction of propagation. (EG: Electromagnetic waves) but there are no particles in eletromagnetic waves.

Longitudinal - A wave where the vibration of particles is parallel to the direction of propagation. (EG: Sound Waves).

Kirchoff’s First Law - Sum of Currents entering a junction = sum of currents leaving the junction.
Kirchoff’s Second Law - Sum of e.m.f.s = Sum of the p.d.s in a closed loop
Ohm’s Law - Potential Difference is directly proportional to the Current, provided physical condition (temperature) remains constant. Must have a straight line and pass through the origin.

Low I - Low Heating Effect.
High I - High Heating Effect.

E.M.F and Internal Resistance

Practice Questions

Q1 What causes internal resistance?

Q2 What is meant by 'lost volts'?

Q3 What is the difference between e.m.f. and terminal p.d.?

Q4 Write the equation used to calculate the terminal p.d. of a power supply.

Exam Questions

Q1 A large battery with an internal resistance of 0.8 Ω and e.m.f. 24 V is used to power a dentist's drill with resistance 4 Ω.

(a) Calculate the current in the circuit when the drill is connected to the power supply. [2 marks]

(b) Calculate the voltage across the drill while it is being used. [1 mark]

Q2 A student mistakenly connects a 10 Ω ray box to an HT power supply of 500 V. The ray box does not light, and the student measures the current flowing to be only 50 mA.

(a) Calculate the internal resistance of the HT power supply. [2 marks]

(b) Explain why this is a sensible internal resistance for an HT power supply. [2 marks]

Q1 -
Internal Resistance is caused by electrons colliding with atoms and losing energy, therefore batteries must have resistance. This is called Internal Resistance

Q2 -
'Lost volts' is the energy lost per coulomb due to the Internal Resistance in the battery.

Q3 -
E.M.F: The change of energy from chemical to electrical
P.D: The change of energy from electrical to heat, light or through components in the circuit.
Q4 -
V=IR

Exam Questions

Q1 -
a.) V=IR so I must equal V/R
I=V/R I=24/4.8
= 5A

b.) V=IR
V=5x4=20V

Q2 -
a.) R=V/I
R=500/(50x10^-3) = 10000 Ω

b.) There is a very high internal resistance therefore only a small amount of current can pass through, reducing risk to the user.

Physics

	A	B	C	D
June 2009	64	56	49	42
Jan 2010	56 <3 dayumm	49	42	36
June 2010	67	59	51	44
Jan 2011	66	58	51	
June 2011	68	60	52	44
Jan 2012	**73**	66	60	54
June 2012	**73**	65	58	51
Jan 2013	**67**			

Can i request that the E grade boundaries are put in as i got a U in jan so i cant expect much like you lot.
Jan 2013 67 really?haha whaaaat????

Grade Boundaries ^^^^^^^^^^

This exam is worth 50% of your overall AS Physics grade or 25% of your overall A2 Physics grade I think. correct.

Definitions (Quantum)
Photon - a quantum of electromagnetic energy

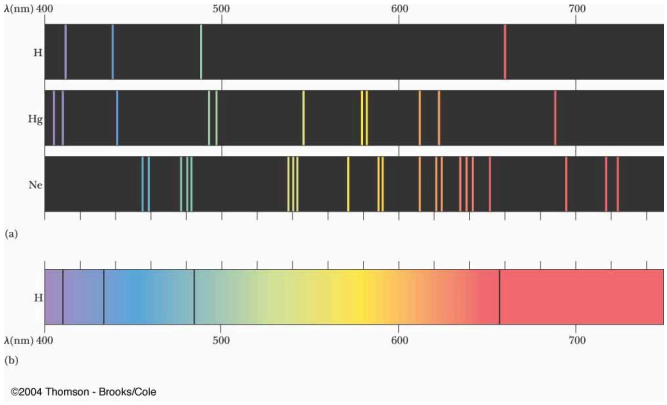
The electronvolt(eV) - 1eV is the energy transferred (gained?)(transferred will do i guess) by an electron travelling through a p.d. of 1V. 1eV = 1.6e-19J

Work function - the minimum energy required to release an electron from a metal surface

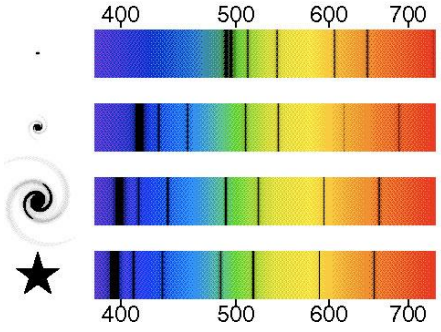
Threshold frequency - the minimum frequency of radiation required to release an electron from a metal surface

Continuous spectrum - a spectrum in which all wavelengths are present

Emmision line spectrum - a series of sharp coloured lines against a dark background, each corresponding to a particular wavelength. Line spectra are produced by isolated excited atoms.



Absorbtion line spectrum - a series of discreet dark lines corresponding to particular wavelengths within a continuous spectrum.



courtesy from Max:) thank you. no worries ;)

Formulae Booklet - Very suprised that someone hasn't uploaded this yet, so I did :)

Unit 2 – Electrons, Waves and Photons

$\Delta Q = I\Delta t$

$I = Anev$

$W = VQ$

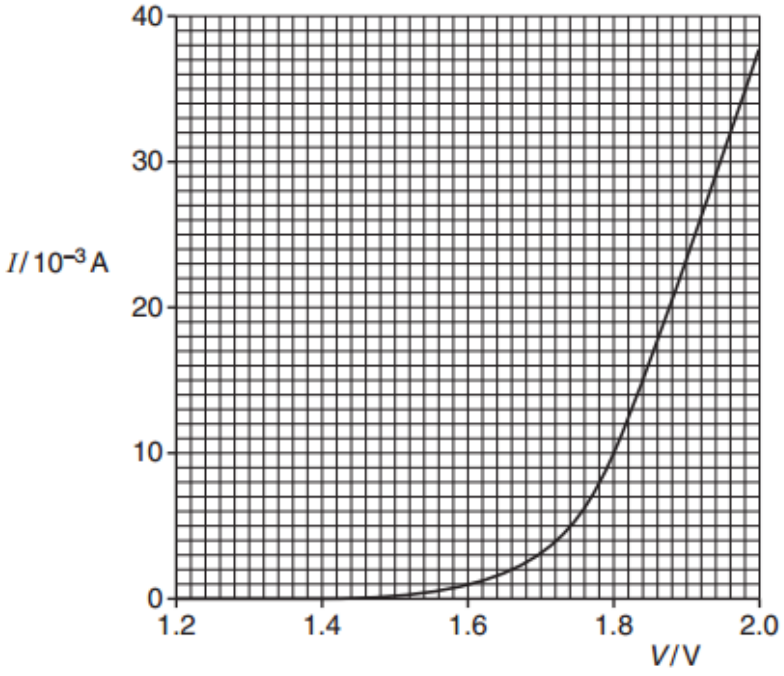
$V = IR$

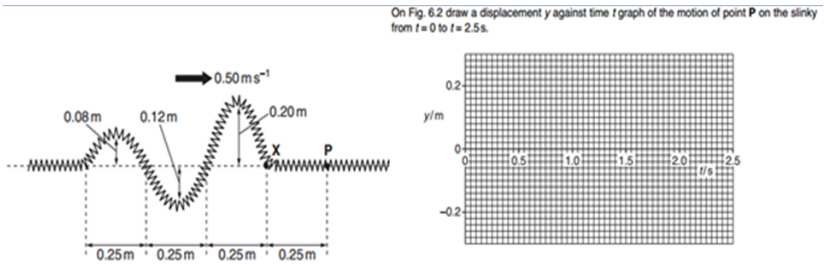
$R = \frac{\rho L}{A}$

NOTE: You don't need to learn these, they will be in the formulae booklet that you will recieve with your exam on the 5th June 2013.

KWh is a unit of Energy and not of power as Js-1 *s = J

On a Voltage Current graph like this one the gradient is **NOT** the resistance. It's 1/R

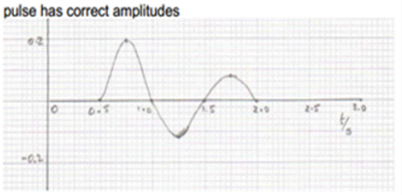




On Fig. 6.2 draw a displacement y against time t graph of the motion of point **P** on the slinky from $t = 0$ to $t = 2.5$ s.

Fig. 6.1

pulse starts at 0.5 s	B1	
ends at 2.0 s	B1	
pulse shape is reversed from Fig 6.1	B1	ie amplitude decreasing from L to R over 1.5s accept inversion in time axis
pulse has correct amplitudes	B1	NB if extra loops, probably only first marking point available if diagram looks like a coiled spring rather than a smooth curve, 1st, 2nd and 4th marking points are possible



Can someone explain HOW??

Think of the 3 parts of the wave moving from left to right. point P stays in the same place like when you have a ball in the sea and the waves move over is but the ball stays in the same place.

that wave travels at 0.5ms-1 and the first part of the wave is 0.25m distance away from point P.
s=d/t → t =d/s so t=0.0.25/0.5 t=0.5 so the graph starts at 0.5 and reaches a maximum at 0.75 then you get negative displacement as the next part approaches then finally the last peak reaches P and it oscillates again.
I think i got it, your description about the ball and the water wave helped me.Thank you :)
q

WHAT IS NEGATIVE

TEMPERATURE COEFFICIENT?

its a type of thermistor, they show the rapid change in resistance over a narrow temp change. The resistance decreases as the temp of a NTC thermistor increases

anyone done the 2013 past paper?
doing it now

when there is a jump between two points how do you know what color the wavelength is? You don't, but you DO know that with a larger energy difference, as energy = hf, the frequency has to be higher, so that would explain that this colour would be violet (high f). Low energy change = smaller frequency, e.g. red :)

Are you lot keeping physics next year?
hell yeah
I did chem exam today, so bad i fucked up not doing that next year. f322? i murked it ;|

i did the mechanics a few weeks ago i think i murdered that counted up got at least 51 minimum >:)

I think physics is so interesting. Ouch :/

So bigger jump = bigger energy = smaller wavelength = faster frequence? Yes.

Blue about 7 degrees and red about 12

(d sinθ)/n = λ bigger angle causes bigger wavelength so it's gonna be red

so green is the smallest angle there right

nah voilet is think about it like this Infra-red means smaller than red ultra violet means bigger than violet

obviously ultravoilet is stroner and has smaller wavelength

Just remember frequency is proportional to energy if one goes up so does the other

a zebra
the biggest one will be the UV or whichever has smallest f, because E = hf

question, if you use monochromatic light, do you need to place a single slit in front of it or double slits straightway? yea XD from the mark scheme: laser **OR** light source and single-slit in front of double slit,which mark scheme? Aw I have a word document with bunch of questions and answers behind them it doesn't say which one

Describe an experiment to determine the wavelength of monochromatic light (i.e. light of one wavelength) using a double-slit of known slit separation. Include in your answer

- a labelled diagram showing how the apparatus is arranged
- a list of the measurements required to determine the wavelength l of the light
- the formula, with all symbols identified, that could be used to determine l.

okay, so remember $\lambda = ax / D$ so you need measurements for all those things.

a

x

D

those are your measurements.

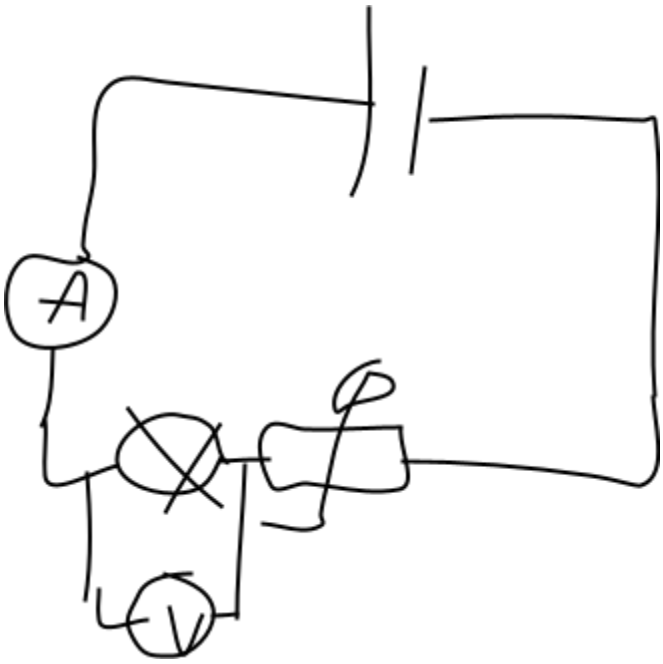
post question.

-yawn-u wanna fite?

u no you can't beat up people who are 6,5 and weight 100kg it's impossible.

Can someone explain the circuit used to determine the I/V Characteristics of a component.

like this:



the best drawing

and how do you take the measurements? is that a variable resistor?

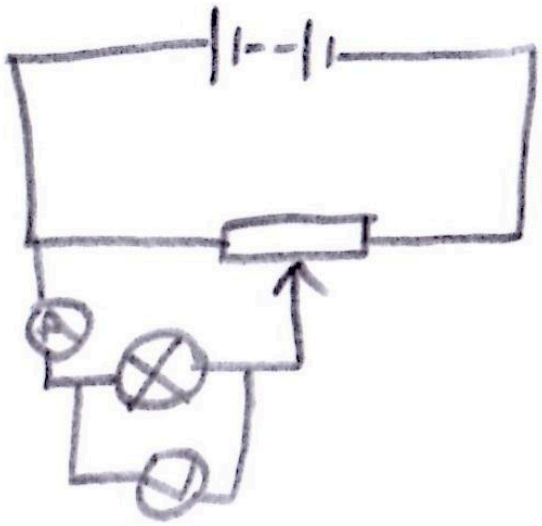
it's a variable resistor and you would just measure the current and voltage while

changing the variable resistor.

Don’t you mean potential difference? not voltage?
they both the same, but what does changing the variable resistor do

I don’t think you would change the variable resistor. You’d keep it at a constant resistance because I/V Graphs show how the resistance varies.
so is this circuit incorrect lol?
anyone wanna fix this up

anyoneee
yes use a potentiometer
watch this: https://www.youtube.com/watch?v=2V-ve8FdHyM he will explain it, and the second part: https://www.youtube.com/watch?v=Pwo4u3a2234, at 9:05 for the circuit.
ok fine look down



Good luck, have fun!

you too

Read the question or else you'll fuck up and

get 0 then you'll live in the gutter for the rest

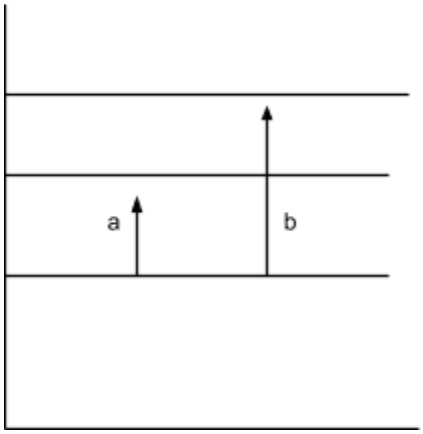
# of your life.

no pressure.

Guys, you know energy levels... Going to sound silly but how do you find the energy of the photo emitted/absorbed? I know you do E1-E2 but whenever i do that it doesnt work and i don't get the same answer as the book. Can someone help?

Okay so for energy levels you can get the energy of the individual photon using E=hf.

lets say a photon has 5eV of energy.



For that photon to have that energy an electron must have lost that energy somehow and given it the the photon. Lets say arrow

a shows photon A with an energy of 5eV. what's happened there is that the electron has gained energy and when it moves back down to it's original position a photon is released. so to find the value of the line that a has gone to you can calculate it.

You know the value for the starting position (lets say it's 3eV and it's changed by 5eV that means the electron must have gained 5eV and then lost it by it becoming a photon. so the value of the level above it would be 3+ 5 so 7eV.

i have no idea.

do you have a specific question i can have a look in the OCR book.

i don't have a specific question but that has really helped thank you!

to calc the energy needed for an electron to move from one level to another use E= E1-E2 thats all...

it genuinely has, im awful at this topic i don't really understand it that much. hopefully going to get my marks for knowing the definitions and formulae.

do you have skyp?
e

no i don't. im going to sleep now anyway to get a good nights rest :)
9
its about 10 hours left.... aw thats too early
well I wish you the best tomorrow!
what time is exam tomorrow lol? morning or afternoon?
im gonna go to bed early and get up at like 6.
nah mate i need to wake up, it takes time.
READ THE FUCKING QUESTIONS PROPERLY READ IT LIKE YOU'RE TALKING TO A 5 YEAR OLD.
good luck night night and good luck x

good luck everyone and make sure you state the obvious because trust me you get the marks e.g for ohic graph straight line that passes through origin

anyhow goood luck my the force of yoda be with you i am errrr its stress