



**Science Revised Syllabus  
Junior Certificate  
Higher Level**

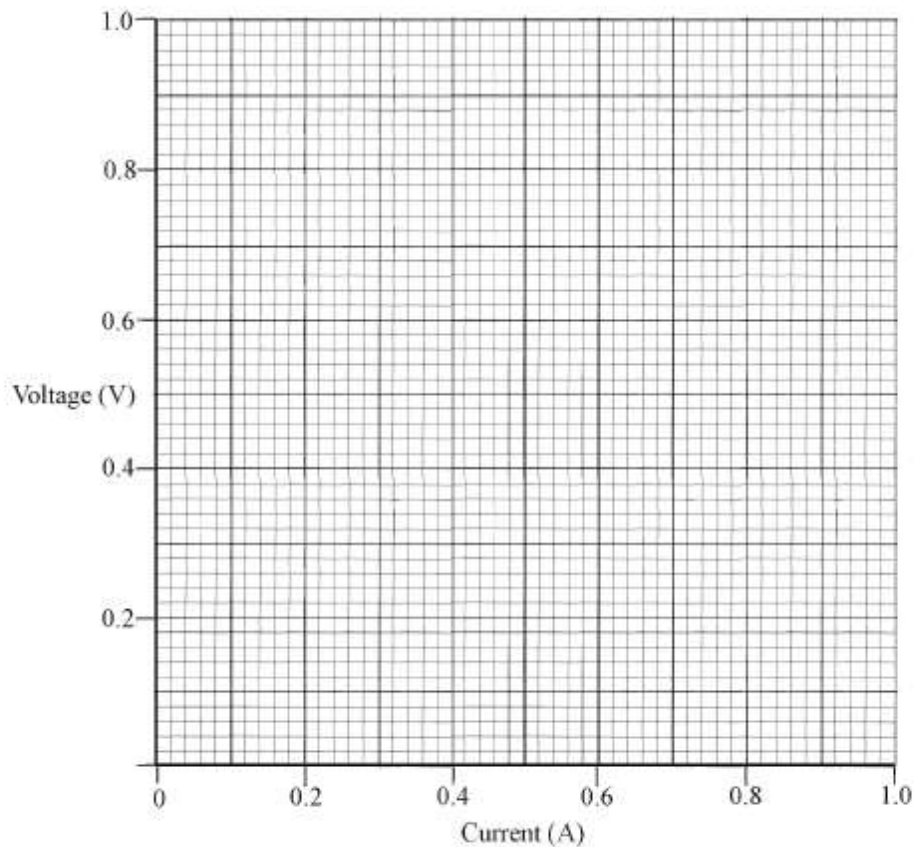
**Past Exam Questions on  
P Electricity and Static Electricity**

**Q9 Part (a) 2013**

- (a) A science student investigated the relationship between voltage and current for a resistor. The data are given in the table below.

Voltage (V)	0	0.22	0.40	0.58	0.80
Current (A)	0	0.20	0.40	0.60	0.80

- (i) Draw a graph in the grid below of voltage *versus* current. (9)



- (ii) Describe clearly the relationship between voltage and current shown by the graph that you have drawn. (6)

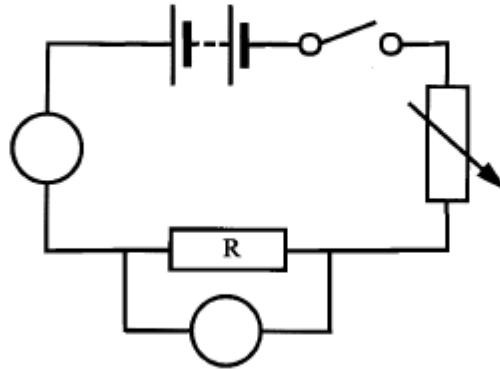
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- (iii) Use the graph to calculate the resistance of the resistor used in this experiment. (6)

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- (iv) The diagram shows the circuit used by the student to perform this experiment. Two meters were used, one to measure voltage and the second to measure current. Enter the symbols for both meters in the circuit diagram, each one in the appropriate circle. (6)



- (v) How was the voltage/current varied when doing this investigation? (3)

\_\_\_\_\_

**Q7 Part (b) 2012**

- (b) Explain the difference between direct current (dc) and alternating current (ac).

Explain \_\_\_\_\_

\_\_\_\_\_

**Q7 Part (g) 2012**

- (g) Fuses are used in some electrical circuits for safety. How does a fuse work for our protection?

How? \_\_\_\_\_

**Q9 Part (a) 2012**

(a) The circuit shown in the diagram was set-up by a pupil. Component C gave out light.

(i) Name components B and C labelled and shown in the diagram. (6)

B \_\_\_\_\_

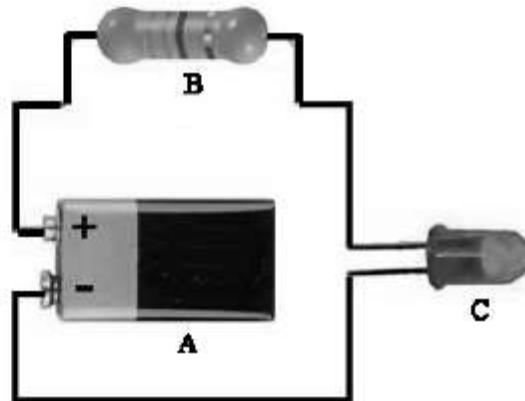
C \_\_\_\_\_

(ii) Give the function of component A and the function of component B. (6)

A \_\_\_\_\_

B \_\_\_\_\_

(iii) Draw a diagram of a circuit that could be used to measure the resistance of a light-dependent resistor (LDR) when exposed to light of varying brightness. (9)



**Q9 Part (b) 2012**

- (b) The plastic comb has been used to comb hair and it now picks up small plastic balls. Why does this happen? (6)



Why? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Q7 Part (g) 2011**

- (g) The boy in the photo is touching a charged globe that is at high voltage. He is insulated from the earth.



What property of electric charge causes the boy's hair to stand on end and apart?

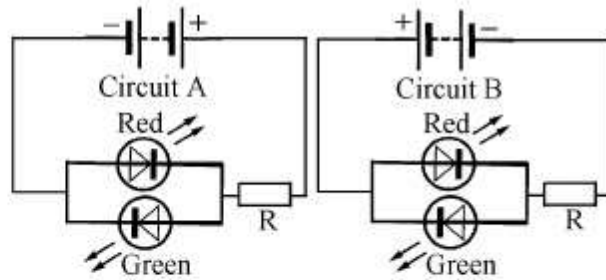
What? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Q7 Part (h) 2010**

(h) Look carefully at circuits A and B, then answer the questions.



(i) In *which circuit* does the red LED light up?

Which? \_\_\_\_\_

(ii) Give a *reason* for your answer to (i) above.

Reason \_\_\_\_\_

(iii) Why is the *resistor 'R'* needed in *both* circuits?

Why? \_\_\_\_\_

**Q7 Part (d) 2009**

(d) A plastic pen when rubbed with a dry cloth can *attract small pieces of paper* which 'stick' to it.

(i) Why does this happen?

Why? \_\_\_\_\_

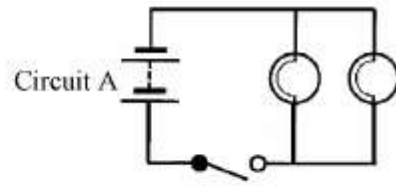
(ii) Explain why the *pieces of paper fall* from the pen after some time.

Explain \_\_\_\_\_



**Q7 Part (h) 2009**

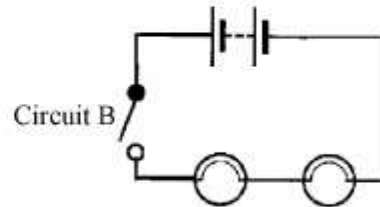
- (h) (i) If a *bulb 'blows'* (fails) in *circuit A* does the *second bulb stay on* (glowing)?  
Give a *reason* for your answer.



Does? \_\_\_\_\_

Reason \_\_\_\_\_

- (ii) If a *bulb 'blows'* (fails) in *circuit B* does the *second bulb stay on* (glowing)?  
Give a *reason* for your answer.

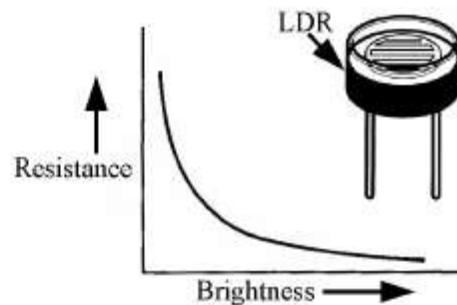


Does? \_\_\_\_\_

Reason \_\_\_\_\_

**Q8 part (b) 2009**

- (b) The diagram shows a light dependent resistor (LDR) and a graph of the resistance of the LDR against the brightness of light falling on it.



- (i) Give an everyday use for an LDR. (3)

\_\_\_\_\_

- (ii) Describe an experiment to *measure the resistance of an LDR under varying degrees of brightness of light*. Draw the *circuit diagram* in the box provided. Explain how you would vary the brightness of the light. You do not have to state how the brightness of the light was measured. (9)

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 \_\_\_\_\_  
 \_\_\_\_\_  
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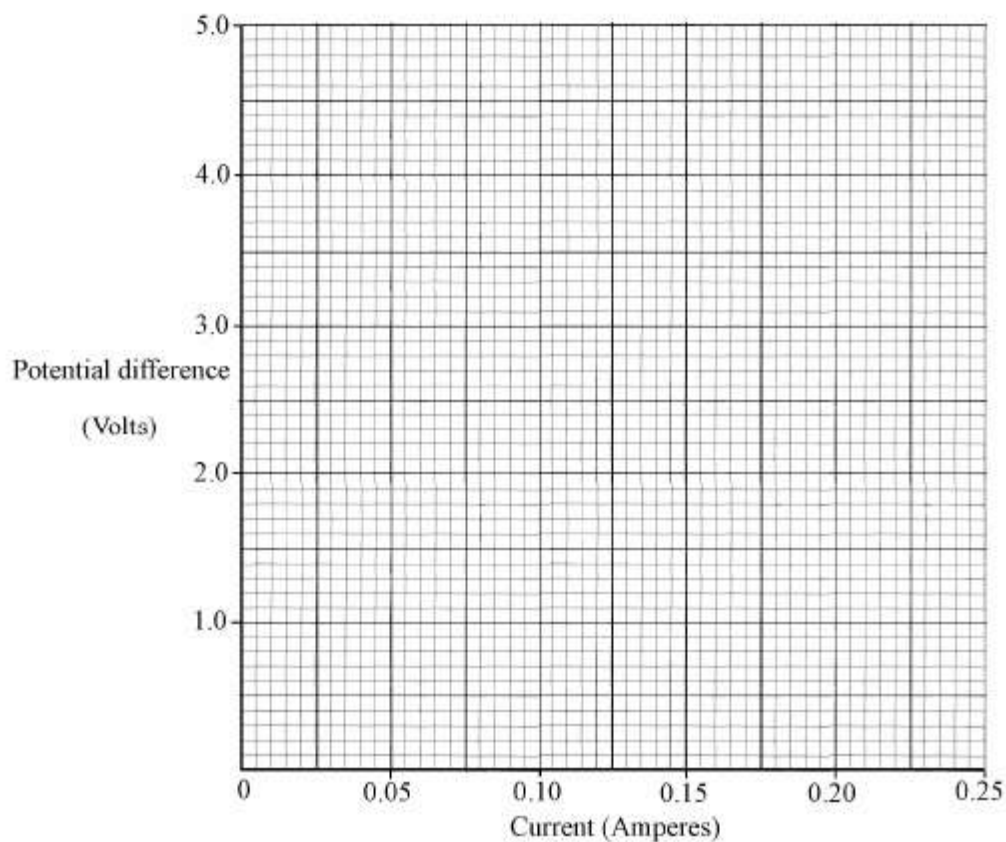


**Q8 Part (c) 2009**

- (c) A pupil performed an experiment on a resistor to *investigate the relationship between potential difference (voltage) applied to the resistor and the current flowing through the resistor*. The data from this experiment is in the table.

Potential difference (Volts)	0	1	2	3	4	5
Current (Amperes)	0.00	0.05	0.10	0.15	0.20	0.25

- (i) Draw a *graph* of potential difference (voltage) on the y-axis against current on the x-axis in the grid below. (6)



- (ii) Calculate the *resistance* of the resistor used in this experiment. (3)

Calculate \_\_\_\_\_

- (iii) What is the evidence from the graph that potential difference (voltage) is *directly proportional* to current in this case? (3)

What? \_\_\_\_\_



**Q6 Part (a) 2008**

(a) Atoms of *different elements* can form *compounds* by *bonding* together.

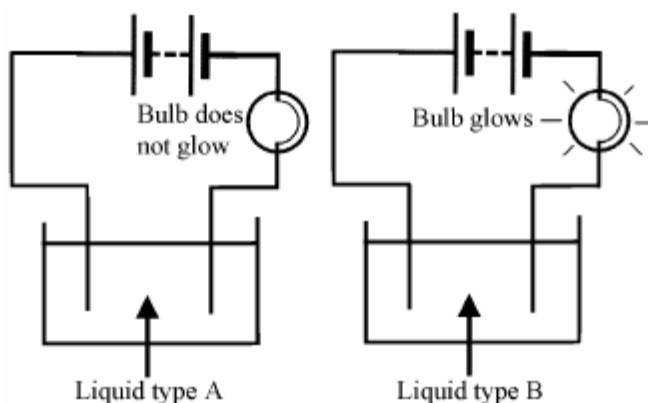
(i) What is an *ionic bond*? (6)

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A pupil investigated the *ability of covalent and ionic substances to conduct electricity*. Four substances were selected. One was a liquid. The other three substances were solids and these were dissolved in pure water before testing. The apparatus used in the investigation is drawn below. When the liquids were tested the bulb did not glow in some cases (Liquid type A) and the bulb glowed in other cases (Liquid type B).



The results of the investigation are given in the table.

Liquid	Cooking oil	Table salt	Table sugar	Copper sulphate
Liquid type	A	B	A	B

(ii) Name the *ionic substances* in the table. Give a *reason* for your answer. (9)

Name \_\_\_\_\_

Reason \_\_\_\_\_

(iii) **Three** of the *substances tested* are *solid at room temperature*. Why were these *substances dissolved in water* before the investigation? (3)

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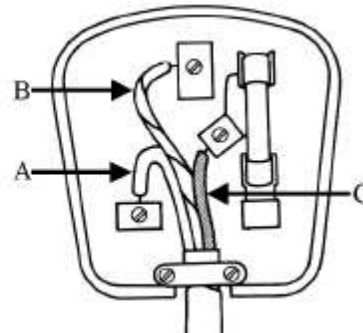


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**Q7 Part (d) 2008**

- (d) Wiring a plug correctly is most important. Give the *colour/s* of any two of the plastic insulations on the wires labelled A, B and C.

A \_\_\_\_\_  
B \_\_\_\_\_  
C \_\_\_\_\_



**Q7 Part (h) 2008**

- (h) Nikola Tesla (1856-1943) showed at the Frankfurt Fair in 1891 that *alternating current* could be transmitted over much longer distances than *direct current*. This is why the electricity supply to our homes is alternating current. Distinguish between *alternating and direct current*.



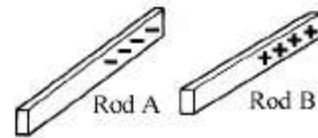
**Distinction** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What is the *average voltage* of domestic alternating current in Ireland?

**Average voltage** \_\_\_\_\_

**Q8 Part (a) 2008**

- (a) Two rods A and B, made from *different plastics*, were given the *static electrical charges* shown in the diagram.



- (i) How could you have *charged* the rods as shown? (6)

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- (ii) Describe with the help of a labelled diagram in the box provided, how the *force between the two charged rods A and B* could be *investigated*.  
What *result* would you expect from this investigation? (9)

Description \_\_\_\_\_

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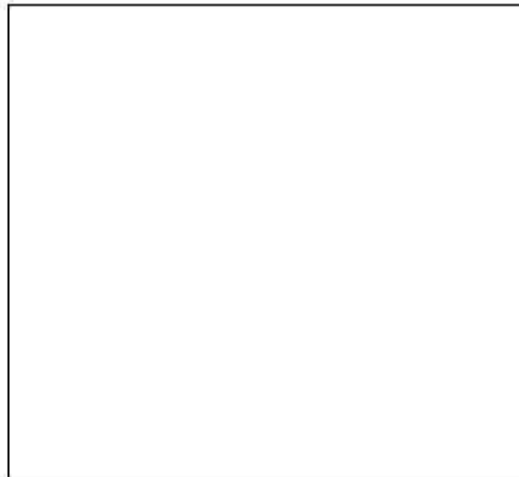
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Result \_\_\_\_\_

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- (iii) In dry weather you can sometimes get an electric shock from a supermarket trolley. This is caused by the build-up of static electricity on the trolley.



Explain clearly why this only happens in dry weather. (6)

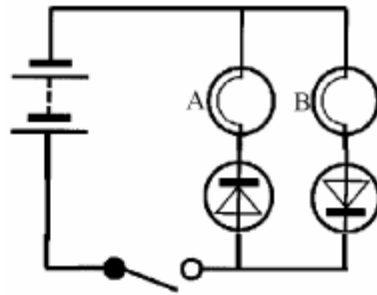
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**Q7 Part (c) 2007**

- (c) Look carefully at the circuit diagram and then state *which bulb/s, if any, light* when the switch is closed.  
Give a *reason* for your answer.



Which? \_\_\_\_\_

Reason \_\_\_\_\_

**Q7 Part (d) 2007**

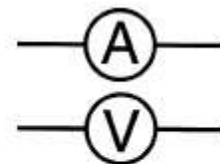
- (d) Give **one application** of the *magnetic effect* and **one application** of the *chemical effect* of electric current.

Magnetic effect \_\_\_\_\_

Chemical effect \_\_\_\_\_

**Q9 Part (b) 2007**

- (b) The symbols for two electrical meters are given in the diagram. The symbol  $\text{---}\text{V}\text{---}$  is for a meter that measures potential difference, often called 'voltage'.



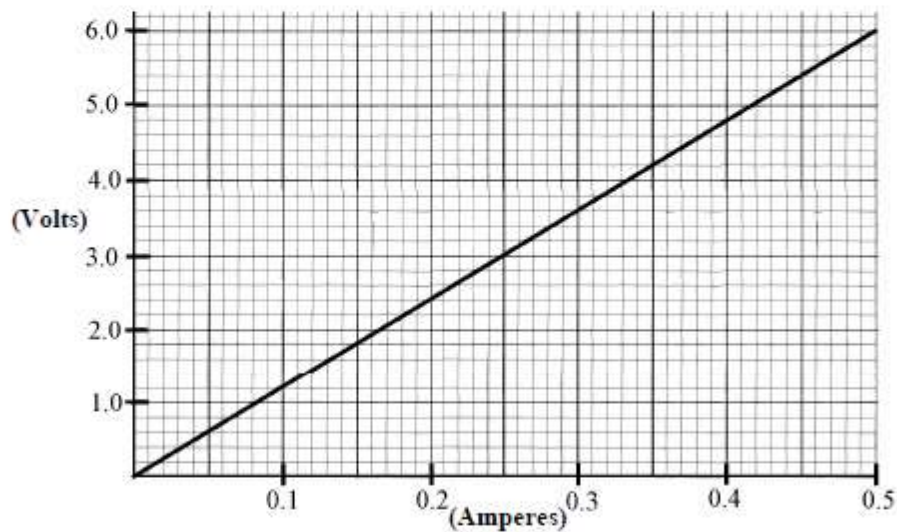
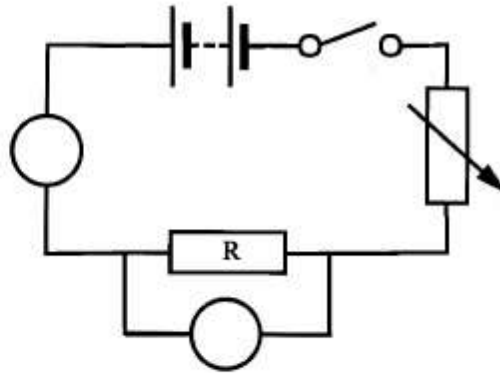
What *electrical quantity* can be measured using the meter with the symbol  $\text{---}\text{A}\text{---}$ ? (3)

What? \_\_\_\_\_

Meters  $\text{---}\text{A}\text{---}$  and  $\text{---}\text{V}\text{---}$  are used in the circuit shown.

Enter 'A' into the *appropriate circle* of one of the meter symbols in the circuit diagram so as to clearly identify its correct position. (3)

A pupil used this circuit to get a set of readings from both meters for different values and then plotted this data in the graph shown.



Use this graph to *calculate the resistance* of resistor **R** shown in the diagram. Give the unit of resistance with your answer. (9)

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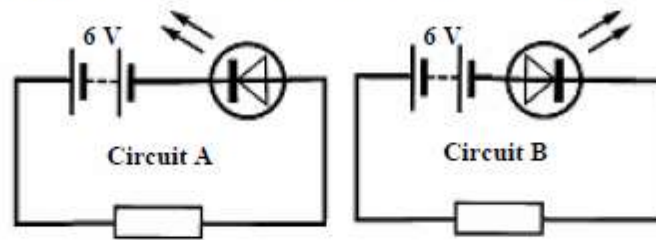
### Q7 Part (f) 2006

(f) Explain, clearly, the *safety role* of *fuses* in household electrical circuits.

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**Q7 Part (h) 2006**

(h) A pupil carried out an investigation into *the effect of a diode on d.c. and on a.c.* circuits using an LED. The following circuits were initially set up.



What is *observed* in circuit A and in circuit B?

Circuit A \_\_\_\_\_

Circuit B \_\_\_\_\_

When the batteries in circuits A and B were replaced by 6 V a.c. supplies the LEDs glowed dimly in both circuits. Explain this *observation*.

Explanation \_\_\_\_\_

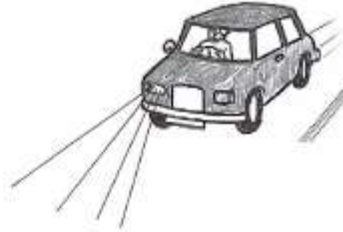
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**Q9 Part (b) 2006**

(b) Components, e.g. bulbs, in electrical circuits can be connected in *series* or in *parallel*.

(i) It is noticed that, when one headlight fails (blows) in a car, the second remains lighting.



State *the way the headlights are connected* and give a *reason* why this mode of connection is used. (6)

State the way \_\_\_\_\_

Reason \_\_\_\_\_

\_\_\_\_\_

(ii) All of the bulbs go out in an old set of Christmas tree lights, when one of bulbs fails (blows). In *what way are the bulbs connected* in this set of lights?



Explain why, when *one bulb blows*, they all go out. (6)

What way? \_\_\_\_\_

Explain \_\_\_\_\_

(iii) Calculate the *resistance of the filament* of a car headlamp when 12 V produces a current of 5 A in it.

In what unit is resistance measured? (6)

Resistance \_\_\_\_\_

Unit of resistance \_\_\_\_\_