

## Physics: 14. Current Electricity

### Exam questions

1. [2008 OL]

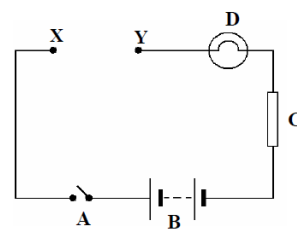
The diagram shows a simple electrical circuit.

Complete the table below correctly matching each of the names of the

components in the circuit with one of the labels

A, B, C or D.

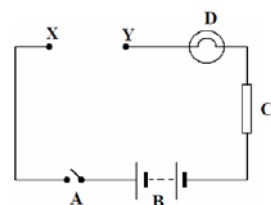
Label	Circuit component
	Bulb
	Power supply
	Resistor
	Switch



2. [2008 OL]

You are given a piece of copper metal and a piece of timber.

Which piece, metal or wood, should you connect between X and Y in order that the bulb would light when the switch is closed? Give a reason for your choice.

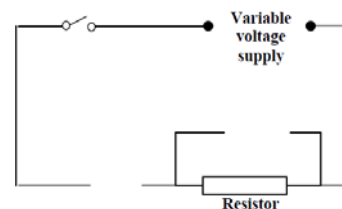
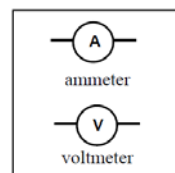


3. [2007 OL]

A student set up the circuit shown to investigate the relationship between the potential difference (voltage), the current and the resistance of a wire conductor.


Gaps are left in the diagram in the places where the ammeter and voltmeter should be placed. The symbols for these devices are given on the right.

Complete the circuit inserting the symbols for the ammeter and the voltmeter in their correct positions.



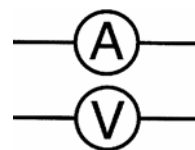
4. [2007]

The symbols for two electrical meters are given in the diagram.

The symbol  is for a meter that measures potential difference, often called 'voltage'.

What electrical quantity can be measured using the meter with the symbol

 ?



5. [2006]

Components, e.g. bulbs, in electrical circuits can be connected in series or in parallel.

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.
- 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. [2006]

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

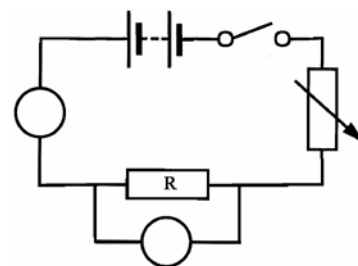
In what unit is resistance measured?

7. [2007 OL]

The student used the variable voltage supply to apply different voltages across the resistor. She measured the voltage across the resistor and the current passing through it several times. She collected the following data.

- (i) Draw a graph of the voltage (y-axis) against the current (x-axis).  
(ii) What conclusion can you draw from the graph about the relationship between the potential difference (voltage) and the current passing through the wire conductor?

Voltage (V)	0	2	4	6	8
Current (A)	0	0.5	1.0	1.5	2.0

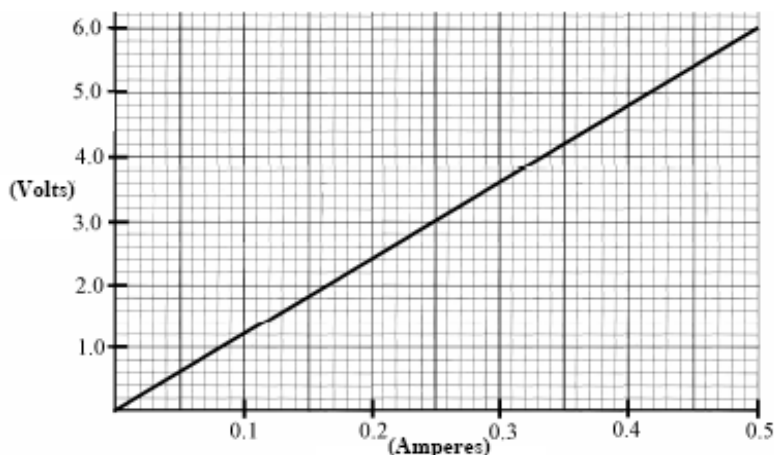


8. [2007]

Meters  $\text{---}\text{V}\text{---}$  and  $\text{---}\text{A}\text{---}$  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.

9. [2007]

A pupil used the circuit above 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.



10. [2007]

Give one application of the magnetic effect and one application of the chemical effect of electric current.

11. [2008]

Distinguish between alternating and direct current.

12. [2008]

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

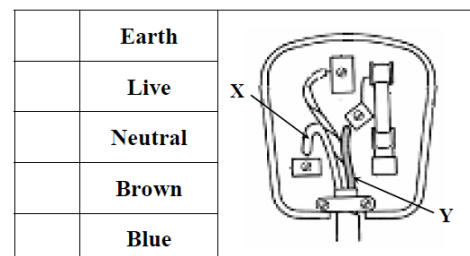
13. [2006]

Explain, clearly, the safety role of fuses in household electrical circuits.

14. [2007 OL]

The diagram shows a three-pin plug with the back removed.

- (i) In the table below write the letter X beside the name of the wire labelled X in the diagram.  
(ii) Write the letter C beside the colour of the insulating on the wire labelled Y.

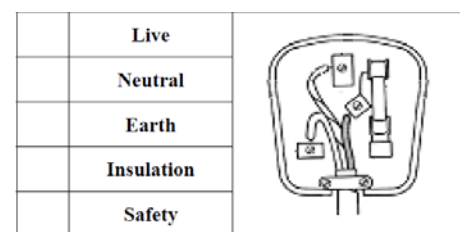


15. [2008 OL]

The diagram shows a three-pin plug with the back removed.

Answer the questions below using the table.

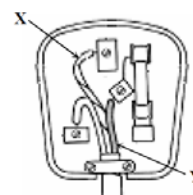
- (i) In the table write the letter X opposite the name of the green and yellow wire.  
(ii) Write the letter Y opposite the name of the wire to which the fuse is connected.  
(iii) Write the letter Z opposite the function of the fuse in a plug.



16. [2006 OL]

The diagram shows a three-pin plug with the back removed.

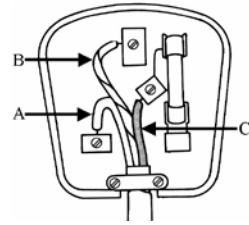
- (i) What is the correct names for the cables labelled X and Y.  
(ii) Give one reason why the back covering (casing) of a plug is made from plastic.  
(iii)



17. [2008]

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.



18. [2008 OL]

(i) Write the letter C beside the unit of electric current.

(ii) Write the letter E beside the unit of electricity used by the ESB for costing.

	Volt
	Ampere
	Kilowatt Hour

19. [2006 OL]

Appliances vary in the amount of electricity they use depending on their power rating.

A tumble drier has a high power rating of 2.5 kW.

(i) Name another appliance found in the home that has a high power rating.

(ii) Name an appliance found in the home that has a low power rating.

20. [2007 OL]

An electric cooker has four hot plates. The total power rating of the four hot plates is 7 kW.

All four are used for a total of 2 hours each day.

(i) How many units of electricity (kWh) are used in 1 week?

(ii) If electricity costs 11 cent per unit how much does this cost?

21. [2006 OL]

The ESB charges for electricity at a rate of 12 cent per kW h.

A tumble drier of power rating 2.5 kW is used for 2 hours each week for 4 weeks.

(i) How many units of electricity are used?

(ii) What is the cost, in cent, of using the tumble drier?

### Exam solutions

1. A: Switch

B: Power supply

C: Resistor

D: Bulb / lamp

2. Metal, because metal is a conductor and wood is an insulator

3. Ammeter in series

Voltmeter in parallel (above the resistor).

4. Current

5.

(i) The headlights are connected in parallel because if one bulb blows the other remains on.

(ii) They are connected in series.

(iii) The circuit is broken.

6.  $R = V/I = 12/5 = 2.4 \text{ Ohm/ } \Omega$

7.

(i) The graph should result in a straight line through the origin.

(ii) Potential difference is proportional to current.

8. 'A' goes into the circle on the left-hand side.

9. The resistance corresponds to the slope of the graph.

Pick two points from the graph and use the formula  $\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$

Slope =  $12 \Omega$  or 12 Ohms

(accept 11.5 to 12.5)

10. Magnetic effect: electromagnets/ door bells/ central locking in cars/ speakers.

Chemical effect: electroplating/ galvanising/ refining of copper.

11. Alternating current changes direction, direct current moves in the same (fixed) direction

12. 220-240 volts
13. The fuse melts if the current is too high and this breaks the circuit.
- 14.
- (i) X: Neutral
  - (ii) C: (Y) Brown
- 15.
- (i) X: Earth
  - (ii) Y: Live
  - (iii) Z: Safety
- 16.
- (i) X: Earth Y: Live
  - (ii) To prevent shock (electrocution) / safety / insulates
17. A is blue/ B is green and yellow / C is brown
- 18.
- (i) C: Ampere
  - (ii) E: Kilowatt hour
- 19.
- (i) Cooker / kettle / toaster / washing machine / dish washer etc
  - (ii) Reading lamp / radio / television
- 20.
- (i)  $7 \times 2 \times 7 = 98$
  - (ii)  $98 \times 11 = \text{€}10.78$
- 21.
- (i)  $2.5 \times 2 \times 4 = 20 \text{ kWh}$
  - (ii)  $20 \times 12 = 240 \text{ cent}$