

## 6: Electricity 2 – Topic questions

## Paper 3

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

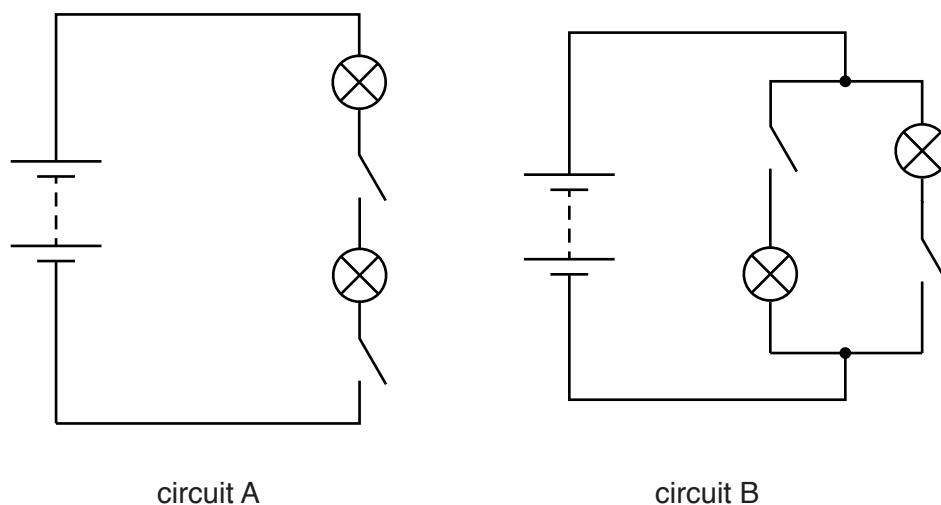
Use these questions to formatively assess your learners' understanding of this topic.

Question	Year	Series	Paper number
5	2016	June	32
11	2016	March	32
8	2016	November	33

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at [www.cambridgeinternational.org/support](http://www.cambridgeinternational.org/support)

- 5 Fig. 5.1 shows two circuits, A and B.



**Fig. 5.1**

Both circuits contain a 6V power supply and two 6V lamps.

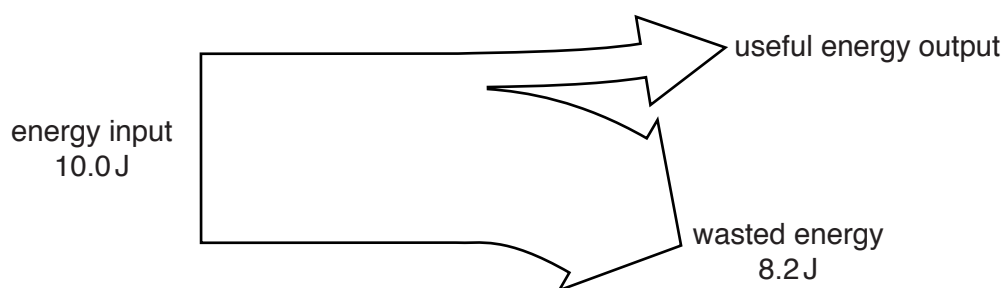
- (a) State **two** advantages of circuit B compared to circuit A.

.....

.....

..... [2]

- (b) Fig. 5.2 shows the energy input and outputs, in one second, for one electric lamp.



**Fig. 5.2**

- (i) Calculate the useful energy output, in one second, of the lamp.

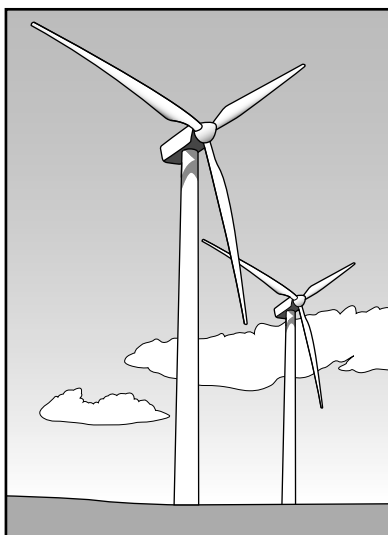
useful energy output = .....J [1]

(ii) In the space below draw a labelled diagram, similar to Fig. 5.2, for a more efficient lamp.

[1]

(c) Electricity can be generated using wind turbines.

Fig. 5.3 shows two wind turbines.



**Fig. 5.3**

State **two** advantages and **two** disadvantages of using wind turbines, rather than fossil fuels, to generate electricity.

advantages .....

.....

.....

.....

disadvantages .....

.....

.....

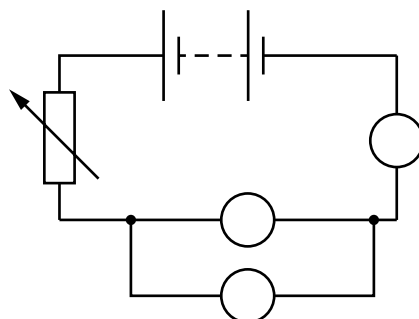
.....

[4]

[Total: 8]

- 11 (a)** A student changes the current in a filament lamp. She measures the current and the potential difference (p.d.) across the lamp.

Fig. 11.1 is an incomplete circuit diagram.



**Fig. 11.1**

- (i) On Fig. 11.1, complete the unfinished circuit symbols. [3]
- (ii) One pair of readings for the lamp is shown in the table.

p.d./V	current/A
6.0	1.2

Calculate the resistance of the filament in the lamp for these readings.

resistance of filament = .....  $\Omega$  [3]

- (iii) After many hours of use, the filament wire in a lamp becomes thinner.

State the effect, if any, on the resistance of the lamp.

.....[1]

- (b)(i) Complete the circuit in Fig. 11.2 to show a battery connected to three lamps arranged in parallel.

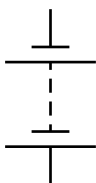


Fig. 11.2

[2]

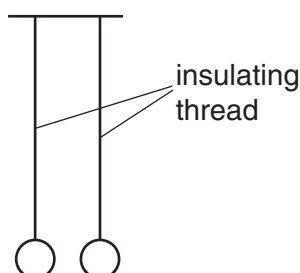
- (ii) Describe **two** advantages of connecting these lamps in parallel with the battery.

.....

.....[2]

[Total: 11]

- 8 Fig. 8.1 shows two uncharged (neutral) plastic spheres. Each sphere is suspended by an insulating thread.



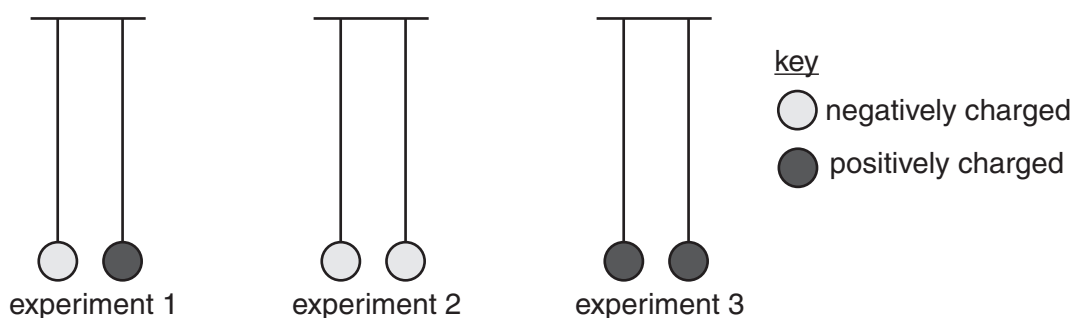
**Fig. 8.1**

- (a) Suggest a material for the insulating threads.

..... [1]

- (b) The spheres can be given a charge.

Three different experiments are carried out using the arrangements shown in Fig. 8.2.



**Fig. 8.2**

For each experiment, describe the force, if any, between the spheres.

experiment 1 .....

experiment 2 .....

experiment 3 .....

[3]

- (c) State and explain how one of the plastic spheres can be given a positive charge.

.....

.....

..... [2]

[Total: 6]

Question	Answer	Mark
5 (a)	any <b>two</b> from: lamps all have 6 V or full voltage (across them) OR lamps are brighter if one (lamp) breaks, little / no effect on other lamps can be switched on and off independently	B2
5 (b) (i)	10 – 8.2 OR 1.8 (J)	B1
5 (b) (ii)	diagram indicating smaller proportion of energy wasted (e.g. greater useful energy output OR smaller wasted energy output OR smaller energy input for same output)	B1
5 (c)	any <b>two</b> advantages from: <ul style="list-style-type: none"> <li>renewable (energy source)</li> <li>does not contribute to global warming</li> <li>does not contribute to atmospheric pollution</li> <li>conserves fossil fuel reserves</li> </ul> any <b>two</b> disadvantages from: <ul style="list-style-type: none"> <li>not a reliable supply of electricity</li> <li>large area of land needed (for a wind farm)</li> <li>unsightly</li> <li>threat to birds</li> <li>large number needed to replace one power station</li> <li>infrastructure more expensive (per MW) than fossil fuel power stations</li> <li>needs a suitable (windy) location</li> </ul>	B2
		Total: 8
11 (a) (i)	ammeter correct symbol in series with lamp voltmeter correct symbol in parallel with lamp lamp correct symbol	B1 B1 B1
11 (a) (ii)	$R = V / I$ in any form C1 $6 \div 1.2$ C1 5 ( $\Omega$ )	C1 C1 A1
11 (a) (iii)	(resistance) increases	B1
11 (b) (i)	3 lamp symbols drawn (lamps connected) in parallel with battery	B1 B1
11 (b) (ii)	any two from: <ul style="list-style-type: none"> <li>lamps all have 6 V or full voltage (across them)</li> <li>if one (lamp) breaks, others continue to operate / little / no effect on others</li> <li>lamps can be switched on and off independently</li> </ul>	B2
		Total: 11

Question	Answer	Mark
8 (a)	any named insulator, e.g. cotton, string etc.	B1
8 (b)	1 = attract	B1
	2 = repel	B1
	3 = repel	B1
8 (c)	(sphere) is rubbed with a cloth electrons move off (sphere) outte	B1 B1
		Total: 6

*Notes about the mark scheme are available separately.*