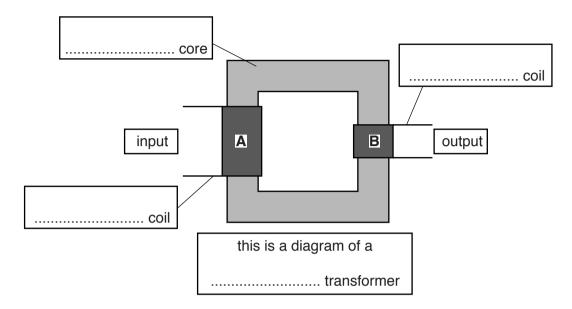
- 1 Transformers are used in many different appliances.
  - (a) Look at the simple diagram of a transformer.



A has 4000 turns and B has 150 turns.

(i) Complete the four labels on the diagram.

[2]

(ii) The input voltage is 10000 V.

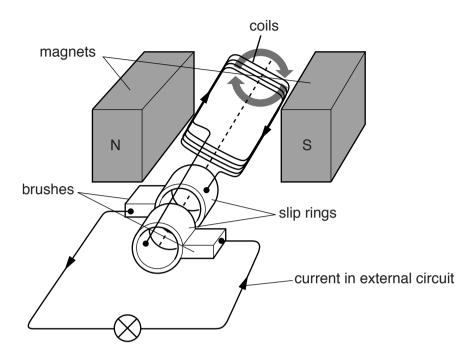
Calculate the output voltage.

output voltageV	[2]

(a)	iransformers are devices that work with alternating current (AC).	
	Explain why transformers require AC.	
		[2]
(c)	Isolating transformers are an important technological advance.	
	How have these improved safety in the home?	
		[2]

2 AC generators are used to generate electricity.

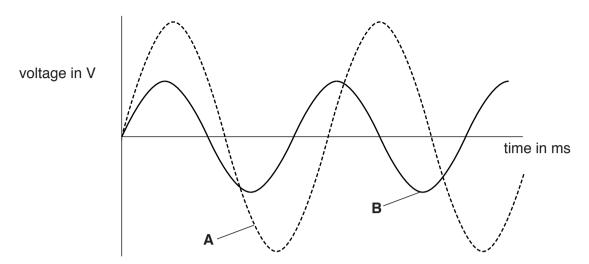
Here is a diagram of a small AC generator.



(a) Explain how this AC generator works.

Ose an the labels in the diagram in your explanation.
[2

(b) Look at the diagram.



Graph A shows the output from this small AC generator.

The generator can also produce the output shown by graph **B**.

Suggest what changes are needed to produce the output shown by graph **B**.

**3** This question is about transformers.

Look at the information about two different transformers.

	transformer A	transformer B		
Type of core	iron	iron		
Number of primary turns	500	1000		
Number of secondary turns	1000	500		
Input voltage	20 volts AC	20 volts AC		

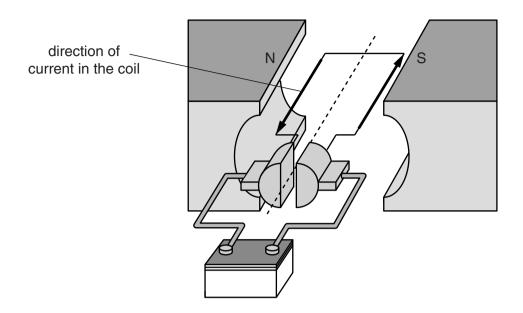
Write about the similarities and differences between transformer  ${\bf A}$  and transformer  ${\bf B}$ .

Include information about how the transformers work, their construction and their output voltages.

The quality of written communication will be assessed in your answer to this question.
 [6]

[Total: 6]

- 4 DC electric motors are used in many different appliances.
  - (a) Look at the diagram of a DC motor.



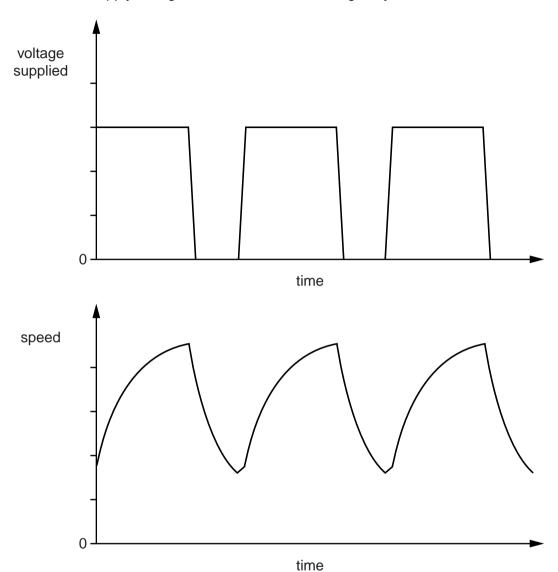
Use Fleming's Left Hand rule to predict if the coil will spin **clockwise** ( ) or **anti-clockwise** ( ) in the following arrangements.

	(i)	Suggest how the <b>same</b> motor can be made to have different speed settings.	
(b)	Mar	ny motors have different speed settings.	
	It wi	Il now spin	[1]
	With	the current still reversed, the north and south poles are also reversed.	
	The	current is reversed. It will now spin	
	The	motor is set up as shown in the diagram. It will spin	

(ii) Look at the data on the graphs.

They show how the voltage supplied and the speed of the motor are related.

The supply voltage is switched on and off regularly.



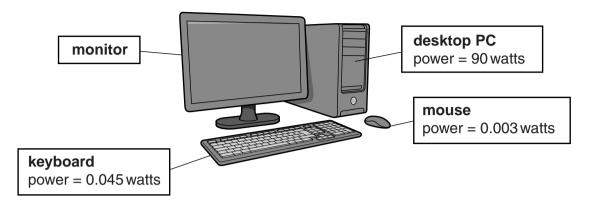
Describe what happens to the speed of the motor as the voltage is regularly switched cannot and off.
[2
Suggest how the speed of the motor will vary if the supply voltage is switched on and concreting frequently.

[Total: 5]

(iii)

5 Kyle has a wireless computing system.

Look at the information in the diagram.



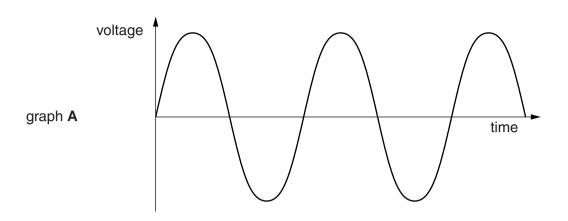
(a)	The monitor plugs into a 230V supply and uses a current of 0.5 A.	
	Calculate the power of the monitor in kilowatts.	
	answer kW	[2]
(b)	The energy supplied to the desktop pc in a day is 0.45 kilowatt hours.	
	How many hours does Kyle use the desktop PC for that day?	
	answer hours	[2]

(6)	THE IIIOIIIIOI ai	id the desktop pc are connected to a 250 v supply.	
	The mouse and	d the keyboard use 3V batteries.	
	Put the four pa	arts of the system in order of the size of current used.	
	One has been	done for you.	
	highest cu	urrent	
		keyboard	
	lowest cu	rrent	[1]
(d)	Increasing the	use of technology has increased energy consumption.	
	This may have	contributed to global warming.	
	People have di	ifferent views about reducing energy use.	
	(a) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	Fatima thinks that it would help if everyone changed to using low energy light bulbs.	
		Claire thinks we could all reduce energy use by walking instead of driving cars.	
	Analyse these	views and discuss how effective they could be for reducing global warming	g.
			[2]

[Total: 7]

6 Electrical generators produce alternating current (AC).

Graph A is the voltage-time graph for an electrical generator.



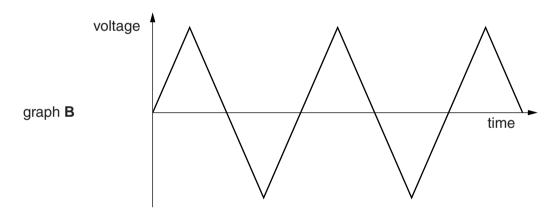
(a) The frequency shown in graph A is 50 Hz.

An alternating voltage produces an alternating current.

On graph A draw another line with a higher frequency.

[1]

(b) Look at graph B.



Does graph **B** also show an alternating voltage?

.....

Explain your answer by **comparing** it with graph **A**.

\_\_\_\_\_[1

[Total: 2]

7 Electricity is generated in power stations.

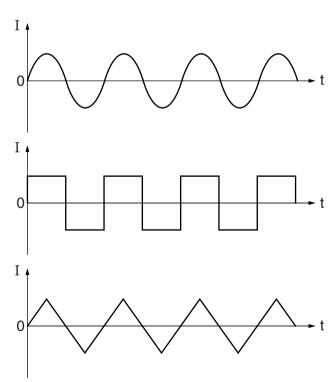
total energy input from the coal			
coal	steam turbine	generator	useful energy output = 170 000 MJ

(a) The efficiency of this power station is 34%.

Calculate the total energy input from the coal	•	
answer	MJ	[1]

**(b)** The generator in the power station produces alternating current (AC).

Look at the three different current-time graphs.



Describe why all the graphs show alternating currents.	
	[1]

[Total: 2]