Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Q1.

Different energy sources are used to generate electricity.

(a) Use words from the box to match the correct energy source to each of the descriptions given in the table.

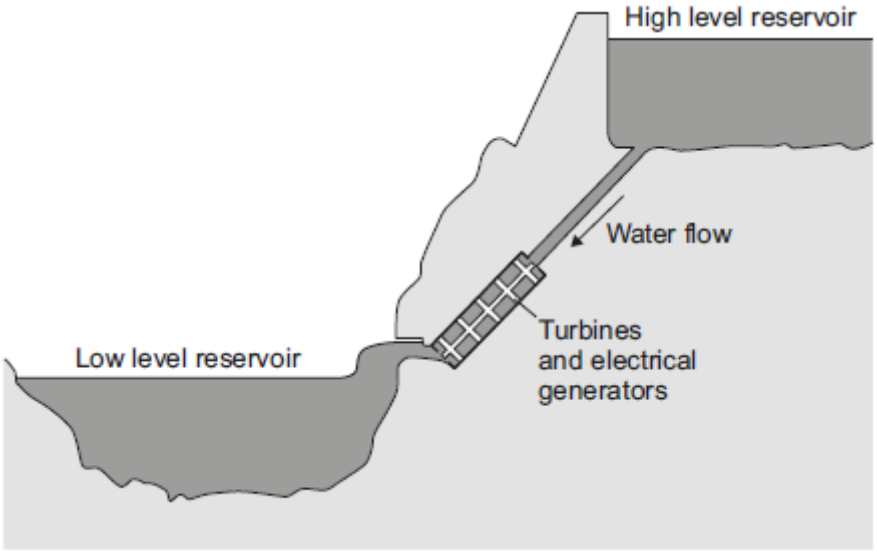
biofuel	coal	geothermal	nuclear	waves

Description	Energy source
Energy from the Earth's core is used to heat water.	
Fission of uranium nuclei is used to heat water.	
Gases from rotting plant material are burned to heat water.	

(3)

(b) Energy can be stored in a pumped storage power station.

The figure shows a pumped storage power station.



When electricity is needed, the water in the high level reservoir is allowed to flow to the low level reservoir. The flowing water generates electricity.

Use the correct answer from the box to complete each sentence.

electrical	gravitational potential	kinetic	nuclear	sound

The water in the high level reservoir stores _____ energy.

The flowing water has _____ energy.

The water turns the turbine which is connected to the generator.

The generator produces some _____, this is wasted energy.

(3)

(c) The total power input to a pumped storage power station is 600 MW.

The useful power output is 540 MW.

(i) Calculate the efficiency of this pumped storage power station.

_____

_____

_____

Efficiency = _____

(2)

(ii) Calculate how much power is wasted by the pumped storage power station.

_____

Power = _____ MW

(1)

(iii) How is the temperature of the surroundings affected by the energy wasted by the pumped storage power station?

_____

(1)

(Total 10 marks)

Q2.

The electric kettle shown below is used to boil water.

©leeser87/iStock

(a) After the water has boiled, the temperature of the water decreases by 22 °C.
The mass of water in the kettle is 0.50 kg.

The specific heat capacity of water is 4200 J/kg °C.

Calculate the energy transferred to the surroundings from the water.

_____

_____

_____

Energy = _____ joules

(2)

(b) Why is the total energy input to the kettle higher than the energy used to heat the water?

Tick (✔) **one** box.

	Tick (✔)
Energy is absorbed from the surroundings.	
Energy is used to heat the kettle.	
The kettle is more than 100% efficient.	

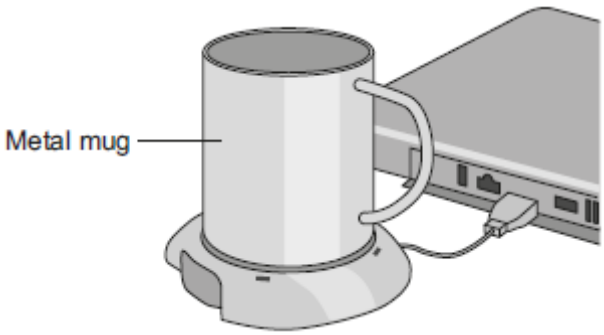
(1)

(Total 3 marks)

Q3.

A heater uses energy from a laptop computer to keep a drink hot.

The image shows a metal mug on the heater.



(a) The laptop computer is operating on battery power.
How would connecting the heater affect the amount of time the laptop computer would operate for, before needing to be recharged?

Tick (✔) **one** box.

	Tick (✔)
it would decrease the time	
it would not affect the time	
it would increase the time	

(1)

(b) The power output from the heater is 12 W.

Calculate the energy transferred to the metal mug in 60 seconds.

_____

_____

_____

Energy = _____ joules

(2)

(c) The table lists changes that may affect the energy transfer per second from the heater to the liquid.

Tick (✔) **one** box to show the effect of each change.

Change	**Energy transfer per second to the liquid**		
	increases	**decreases**	**does not change**
use a mug with a smaller base			
use a lower power heater			
use a plastic mug instead of a metal mug			

(3)

(Total 6 marks)