Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: Energy (Low Demand)

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Name of the Student:_____
Max. Marks : 27 Marks **Time : 27 Minutes**

Q1.

The electric kettle shown below is used to boil water.

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(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.

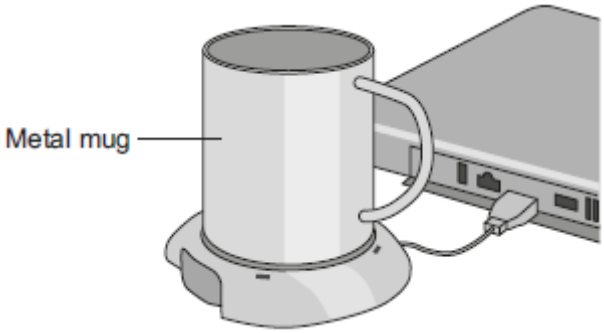
	Tick (✔)
Energy is absorbed from the surroundings.	
Energy is used to heat the kettle.	
The kettle is more than 100% efficient.	

(1)
(Total 3 marks)

Q2.

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			

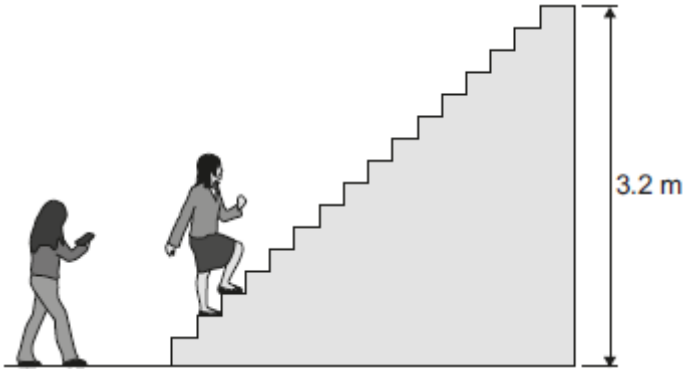
(3)

(Total 6 marks)

Q3.

A student did an experiment to calculate her power.
The diagram below shows how she obtained the measurements needed.

The student first weighed herself and then ran up a flight of stairs. A second student timed how long it took her to go from the bottom to the top of the stairs. The height of the stairs was also measured.



(a) Complete the following sentence.

To run up the stairs the student must do work against

the force of _____ .

(1)

(b) The student did 2240 J of work going from the bottom of the stairs to the top of the stairs.

The student took 2.8 seconds to run up the stairs.

(i) Calculate the power the student developed when running up the stairs.

_____

_____

Power = _____ W

(2)

(ii) How much gravitational potential energy did the student gain in going from the bottom to the top of the stairs?

Tick (✔) **one** box.

much more than 2240 J ☐

2240 J ☐

much less than 2240 J ☐

(1)

(c) Another four students did the same experiment.

The measurements taken and the calculated values for power are given in the table.

Student	Weight in newtons	Time taken in seconds	Power in watts
A	285	3.8	240
B	360	2.4	480
C	600	3.4	560
D	725	4.0	580

(i) To make a fair comparison of their powers the students kept **one** variable in the experiment constant.

What variable did the students keep constant?

_____

(1)

(ii) From the data in the table a student wrote the following conclusion.

'The greater the weight of the student the greater the power developed.'

Suggest why this conclusion may **not** be true for a larger group of students.

_____

_____

(1)

(Total 6 marks)

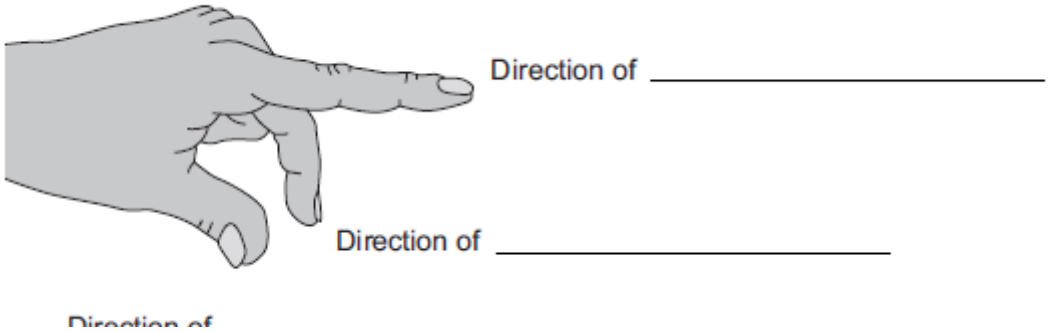
Q4.

The left-hand rule can be used to identify the direction of the force acting on a current-carrying conductor in a magnetic field.

(a) Use words from the box to label **Figure 1**.

current	**field**	**force**	**potential difference**

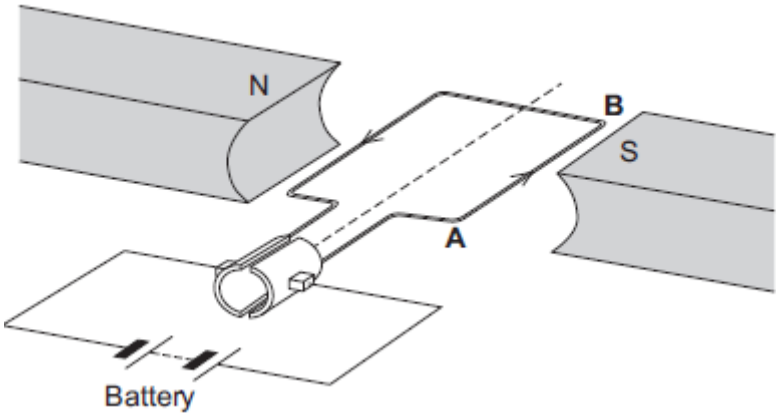
Figure 1



(3)

(b) **Figure 2** shows an electric motor.

Figure 2



(i) Draw an arrow on **Figure 2** to show the direction of the force acting on the wire **AB**.

(1)

(ii) Suggest **two** changes that would increase the force acting on the wire **AB**.

1. _____

2. _____

(2)

(iii) Suggest **two** changes that would reverse the direction of the force acting on the wire **AB**.

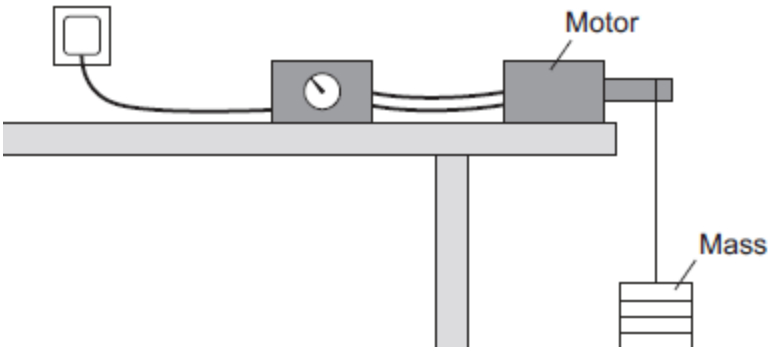
1. _____

2. _____

(2)

(c) A student used an electric motor to lift a mass. This is shown in **Figure 3**.

Figure 3



The student varied the electrical input power to the motor. For each different electrical input power, he recorded the time taken to lift the mass and calculated the output power of the motor.

The results are shown in the table.

Test	Electrical input power in watts	Work done lifting the mass in joules	Time taken to lift the mass in seconds	Output power in watts
A	20	24	2.4	10
B	40	24	1.2	20
C	60	24	0.8	30
D	80	24	0.2	120

The result for **Test D** is anomalous.

(i) Calculate the efficiency of the motor in **Test D**.

_____

_____

Efficiency = _____

(2)

(ii) Comment on your answer to part (c)(i).

_____

_____

(1)

(iii) Suggest a reason for this anomalous result.

_____

_____

(1)

(Total 12 marks)