

Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

The image shows a man using a leaf blower to move some leaves.



The leaf blower is powered by an electric motor connected to a battery.

(a) Energy transfers take place when the leaf blower is being used.

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

chemical	electrical	kinetic	nuclear	sound
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The battery stores _____ energy which is transferred into electrical energy.

The electric motor transfers electrical energy usefully into _____ energy.

The motor wastes energy as _____ energy and as energy that heats the surroundings.

(3)

(b) The total power input to the leaf blower is 750 W.
The useful power output of the leaf blower is 360 W.

Calculate the efficiency of the leaf blower.

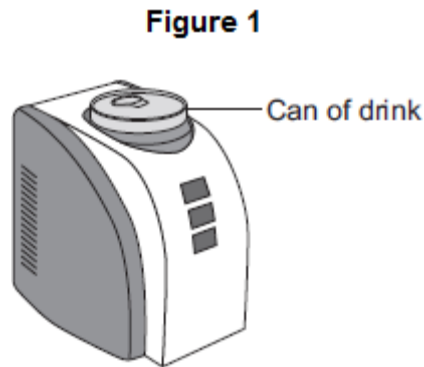
Efficiency = _____

(2)
(Total 5 marks)

Q2.

A 'can-chiller' is used to make a can of drink colder.

Figure 1 shows a can-chiller.



- (a) The can-chiller decreases the temperature of the liquid in the can by 15°C .
The mass of liquid is 0.33 kg .
The specific heat capacity of the liquid is $4200\text{ J / kg }^{\circ}\text{C}$.

Calculate the energy transferred from the liquid as it cools.

Energy = _____ J

(2)

- (b) Complete the following sentence.

The specific heat capacity of a substance is the amount of energy required to
change the _____ of one kilogram of the
substance by one degree Celsius.

(1)

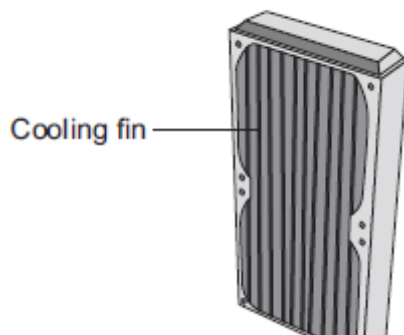
- (c) To calculate the specific heat capacity of a material, the mass of the material needs to be measured.

State the name of a measuring instrument used to measure mass.

(1)

- (d) The back of the can-chiller has cooling fins, as shown in **Figure 2**.

Figure 2



The cooling fins increase the rate of energy transfer from the can-chiller to the surroundings.

Complete the following sentences.

The cooling fins are a _____ colour because that makes them good emitters of infrared radiation.

The large surface area of the cooling fins allows the air around the can-chiller to gain energy quickly and rise, transferring energy by _____.

(2)

- (e) (i) The energy input to the can-chiller is the same as the energy output. This shows that energy is conserved.

Complete the following sentence.

Energy can be transferred usefully, stored or dissipated, but cannot be _____ or destroyed.

(1)

- (ii) The temperature of the can of drink decreases while it is in the can-chiller.

What happens to the temperature of the air around the cooling fins?

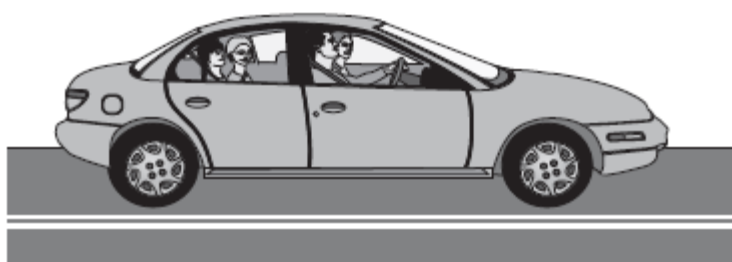
(1)

(Total 8 marks)

Q3.

The figure below shows a car with an electric motor.

The car is moving along a flat road.



- (a) (i) Use the correct answers from the box to complete each sentence.

light	electrical	kinetic	potential	sound
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The car's motor transfers _____ energy
into useful _____ energy as the car moves.
Some energy is wasted as _____ energy.

(3)

- (ii) What happens to the wasted energy?

(1)

- (b) The electric motor has an input energy of 50 000 joules each second.

The motor transfers 35 000 joules of useful energy each second.

Calculate the efficiency of the electric motor.

Efficiency = _____

(2)

(Total 6 marks)