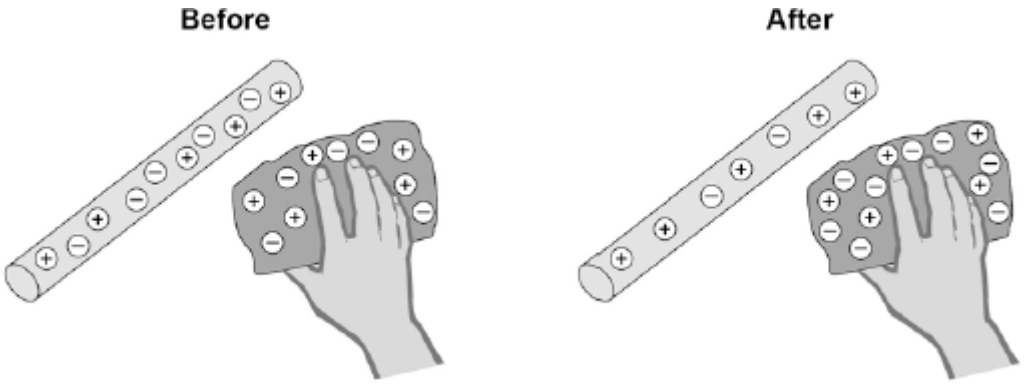
Q1. A student rubs an acetate rod with a cloth.

Figure 1 shows the charges on the acetate rod and cloth before and after rubbing.

Figure 1



(a) Explain how rubbing an acetate rod with a cloth causes the rod and cloth to become charged.

.....

.....

.....

.....

.....

.....

.....

.....

(4)

(b) After charging them, the student moves the acetate rod and the cloth closer together.

Which statement is correct?

Tick **one** box.

There is no force between the acetate rod and the cloth. ☐

There is a force of attraction between the acetate rod and the cloth. ☐

There is a force of repulsion between the acetate rod and the cloth. ☐

Give a reason for your answer.

.....

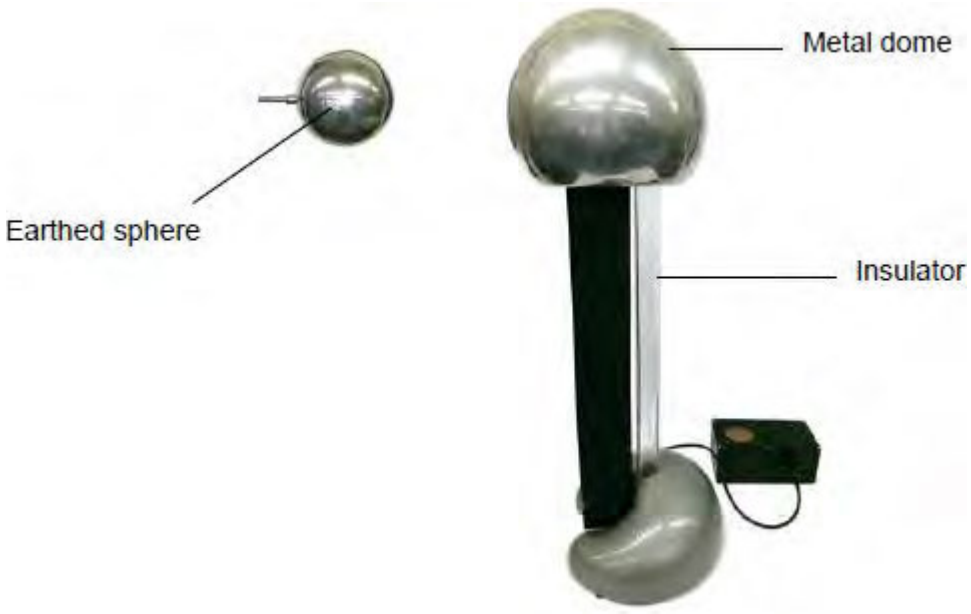
.....

.....

(2)

(c) **Figure 2** shows a Van de Graaff generator, which is used to generate static electricity.

Figure 2



© Michael Priest

The longer the Van de Graaff generator is switched on, the more charge is stored on the metal dome.

Use an answer from the box to complete the sentence.

decrease	**increase**	**stay the same**

The amount of charge on the metal dome is increased, which causes the potential

difference between the metal dome and the earthed sphere to

..... .

(1)

(d) When the potential difference between the Van de Graaff generator and the earthed sphere is 60 kV, a spark jumps between the metal dome and the earthed sphere.

The spark transfers 0.000025 coulombs of charge to the earthed sphere.

The equation which links charge, energy and potential difference is:

energy transferred = charge × potential difference

Calculate the energy transferred by the spark.

.....

.....

.....

Energy transferred = ... J

(2)

(Total 9 marks)

Q2. A student did an experiment with two strips of polythene. She held the strips together at one end. She rubbed down one strip with a dry cloth. Then she rubbed down the other strip with the dry cloth. Still holding the top ends together, she held up the strips.



(a) (i) What movement would you expect to see?

.....

.....

(1)

(ii) Why do the strips move in this way?

.....

(2)

(b) Complete the **four** spaces in the passage.

Each strip has a negative charge. The cloth is left with a.....

charge. This is because particles called ..... have been transferred

from the ..... to the ..... .

(4)

(c) The student tried the experiment using two strips of aluminium. The strips did not move.

Complete **each** of the sentences.

(i) Materials, such as aluminium, which electricity will pass through easily, are called ..... .

(1)

(ii) Materials, such as polythene which electricity will **not** pass through easily, are called ..... .

(1)

(Total 9 marks)

Q3. You wash and dry your hair, then comb it with a plastic comb. As you move the comb away from your head some hairs are attracted to the comb.

(a) What has happened to the comb to make it attract the hairs?

.....

.....

(1)

(b) If the comb is now held above some small pieces of dry tissue paper what is likely to happen?

.....

.....

(1)

(c) If you rub your hands all over the comb it will no longer attract your hair. Explain why.

.....

.....

(2)

(Total 4 marks)

Q4. (a) A student rubs a nylon comb on the sleeve of his jumper.



(i) Use words from the box to complete the following sentence.

electrons	**hand**	**jumper**	**protons**

The comb becomes negatively charged because ..... move

from the student's ..... to the comb.

(2)

(ii) What type of charge is left on the jumper?

.....

(1)

(iii) The negatively charged comb is placed close to a charged plastic ruler. The comb and the ruler attract each other.

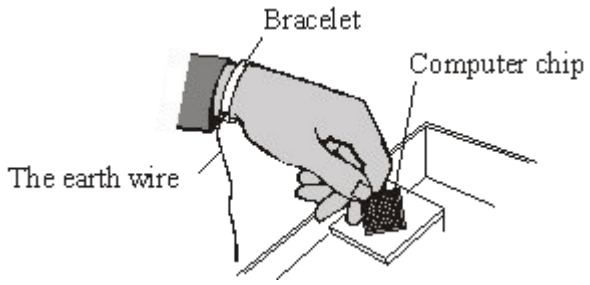
Complete the following sentence by drawing a ring around the correct line in the box.

The ruler is

negatively charged
positively charged
uncharged

(1)

(b) Electrostatic charge can damage computer chips. People working with computer chips may wear a special bracelet, with a wire joining the bracelet to earth (the earth wire). Any negative charge on the person will flow through the wire to earth.



(i) Which **one** of the following materials should the bracelet be made from?

Draw a ring around your answer.

copper **plastic** **rubber**

Give a reason for your answer.

.....

.....

(2)

(ii) Which **one** of the following words is used to describe the rate of flow of charge through a wire?

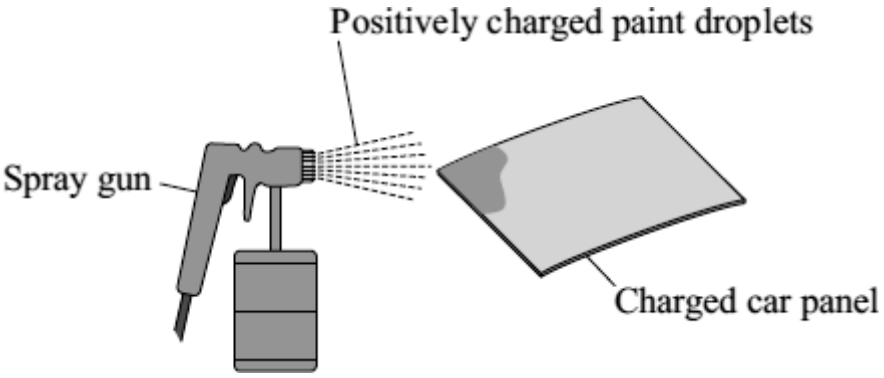
Draw a ring around your answer.

current **resistance** **voltage**

(1)

(Total 7 marks)

Q5. (a) The diagram shows how static electricity is used to paint a metal car panel.



Use words from the box to complete the following sentences.

attract	**opposite**	**repel**	**same**

All the paint droplets have the same type of charge. This makes the paint droplets

..... each other and spread out.

The car panel and the paint droplets have the ..... type of

charge. This causes the car panel to ..... the paint droplets.

The car panel is covered by an even layer of paint.

(3)

(b) In which **one** of the following situations is static electricity dangerous and not useful?

Put a tick (✓) in the box next to your answer.

using a photocopier ☐

refuelling an aircraft ☐

a smoke precipitator ☐

Give a reason for your answer.

.....

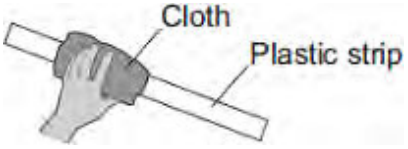
.....

(2)
(Total 5 marks)

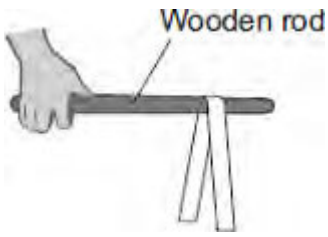
Q6.(a) A student uses some everyday items to investigate static electricity.



1 A strip of plastic is cut from a plastic carrier bag



2 The plastic strip is rubbed with a cloth



3 The plastic strip is hung over a wooden rod

(i) Draw a ring around the correct answer in the box to complete each sentence.

Rubbing the plastic strip with a cloth causes the strip to become negatively charged.

This happens because [electrons / neutrons / protons] move from the cloth onto the plastic strip.

The cloth is left with [a negative / a positive / zero] charge.

(2)

(ii) When the plastic strip is hung over the wooden rod, the two halves of the strip move equally away from each other.

What **two** conclusions should the student make about the forces acting on the two halves of the plastic strip?

1 .....

.....

2 .....

.....

(2)

(b) Electrical charges move more easily through some materials than through other materials.

Through which **one** of the following materials would an electrical charge move most easily?

Draw a ring around your answer.

aluminium **glass** **rubber**

(1)
(Total 5 marks)

Q7. (a) A student takes off his nylon fleece and feels a small electric shock. He realises that this happens because his fleece becomes charged.



Explain why the fleece becomes charged.

.....

.....

.....

.....

.....

(2)

(b) Only **two** of the following statements are correct.

Put a tick (✓) in the boxes next to the **two** correct statements.

Positively charged objects repel negatively charged objects. ☐

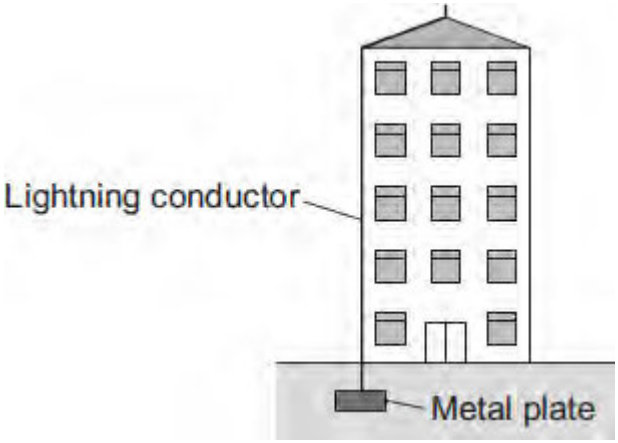
Electrical charges move easily through metals. ☐

Static electricity is safe; it never causes any danger. ☐

An electric current is a flow of electrical charge.

(2)

(c) The diagram shows a lightning conductor attached to the side of a tall building.



If the building is struck by lightning, charge flows to earth through the lightning conductor.

(i) Which of the materials in the list is used to make the lightning conductor?

Draw a ring around your answer.

copper **glass** **plastic**

Give a reason for your answer.

.....

.....

.....

(2)

(ii) Complete the sentence by drawing a ring around the correct line in the box.

The resistance of the lightning conductor is

higher than

the same as	the resistance of the building.
lower than	

(1)

(iii) It is almost impossible to test different designs of lightning conductor in controlled experiments during a lightning storm.

Suggest a reason why.

.....

.....

(1)
(Total 8 marks)