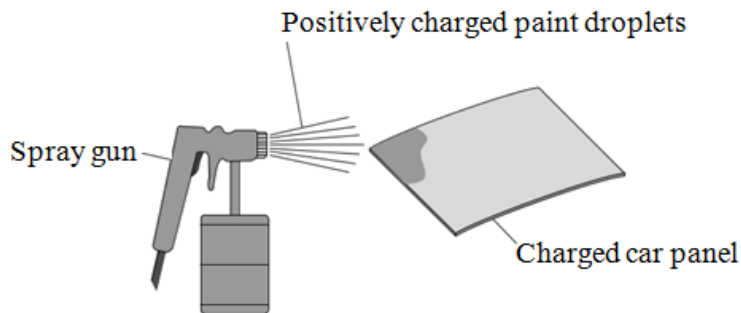


STATIC ELECTRICITY 3

Q:1 (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 marks)

(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

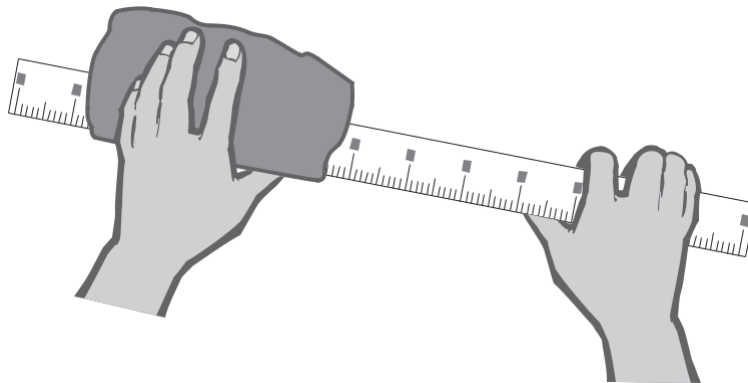
refuelling an aircraft

a smoke precipitator

Give a reason for your answer.

(2 marks)

Q:2 A plastic ruler is rubbed with a cloth.



Some electrons move from the cloth onto the ruler.

(a) (i) What type of charge does the ruler gain?

(1 mark)

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

(1 mark)

(b) The following statement is false.

Objects carrying the same type of charge attract each other.

Change one word in this statement to make it true.

Write down your new statement.

(1 mark)

(c) Many devices use electrostatic charge to work.

The following sentences describe how a photocopier uses electrostatic charge to produce a photocopy. Use words from the box to complete the sentences.

Attracts	charge	insulating	light	photoconducting	repels
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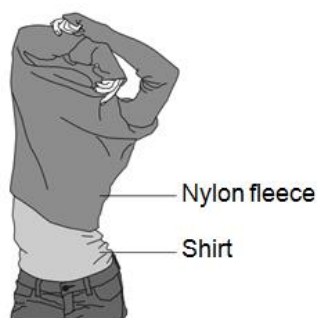
- 1 A roller coated with _____ material is given a charge.
- 2 A strong light is used to form an image of the page to be copied onto the roller.
- 3 Where light hits the roller, the _____ flows to earth.
- 4 The charge left on the roller _____ particles of black toner powder.
- 5 The toner powder sticks to a sheet of paper, producing the photocopy.

(3 marks)

(d) Give one other use for electrostatic charge.

(1 mark)

Q:3 (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 marks)

(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.

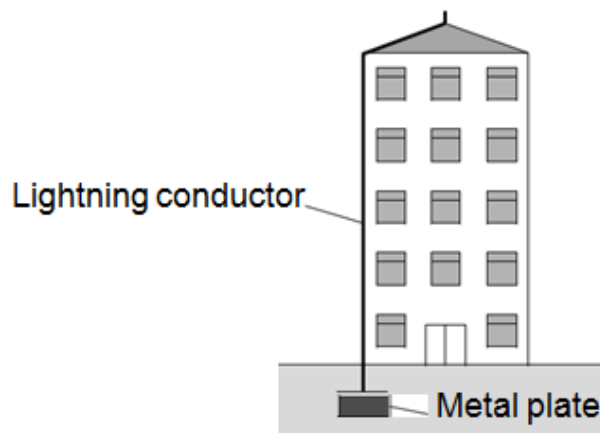
Electrical charges move easily through metals.

Static electricity is safe; it never causes any danger.

An electric current is a flow of electrical charge.

(2 marks)

(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.

(c) (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 marks)

(c) (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 resistance of the building.
the same as	
lower than	

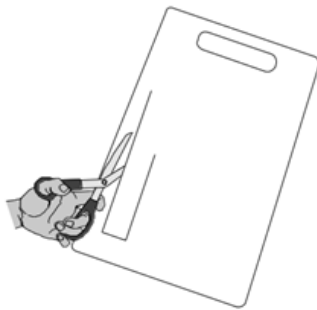
(1 mark)

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

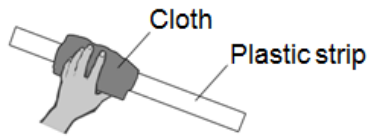
Suggest a reason why.

(1 mark)

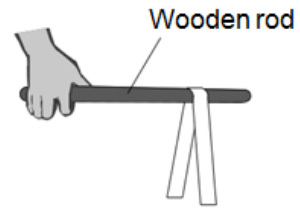
Q:4 (a) A student uses some everyday items to investigate static electricity.



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

(a) (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

a negative
positive
zero

 charge.

(2 marks)

(a) (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 marks)

(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 mark)

TOTAL MARKS=25