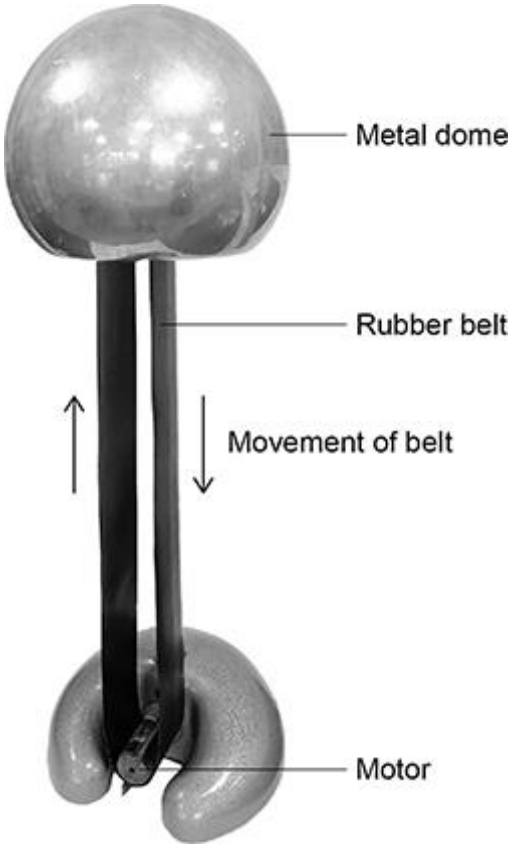
Questions are for separate science students only

Q1.

Figure 1 shows a static electricity generator. **(Physics only)**

Figure 1



The rubber belt is turned by a motor.

As the rubber belt moves, charge is transferred from the rubber belt to the metal dome.

Figure 2 shows a student touching the metal dome of the static electricity generator.

The dome is negatively charged.

Figure 2

(a) Complete the sentence.

Choose the answer from the box.

negative	**neutral**	**positive**

When the student touches the negatively charged metal dome the student's hair gains a _____ charge.

(1)

(b) Complete the sentence.

Choose the answer from the box.

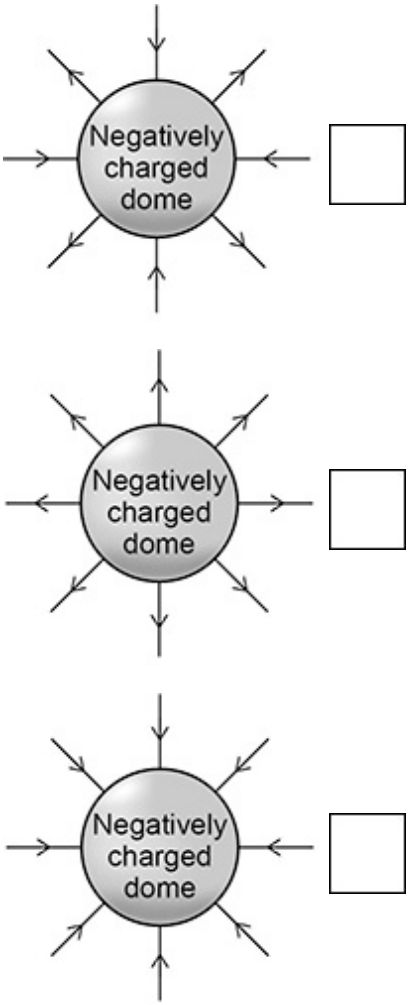
attraction	**gravity**	**repulsion**

The hair on the student's head stands up because the strands of hair experience forces of _____ .

(1)

(c) Which of the following diagrams shows the electric field pattern around the negatively charged metal dome?

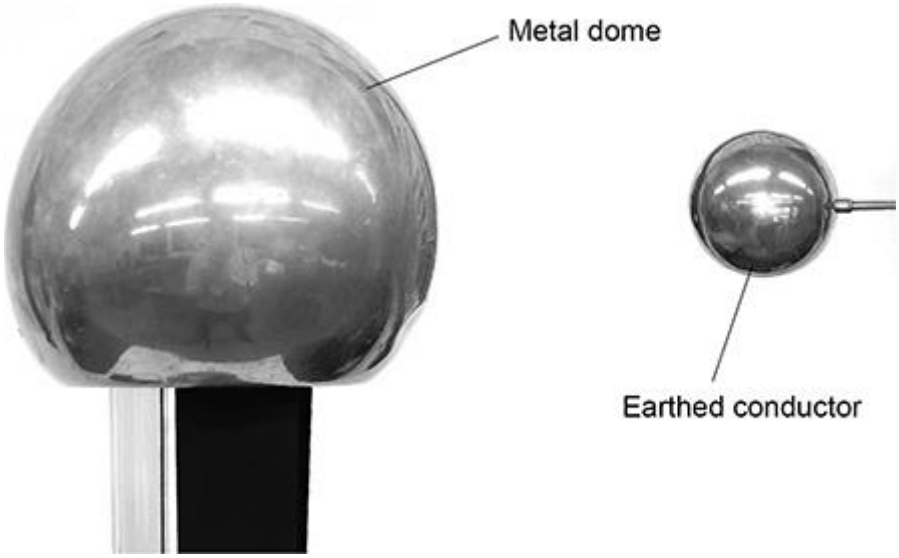
Tick (✓) **one** box.



(1)

Figure 3 shows the negatively charged metal dome and an earthed conductor.

Figure 3



(d) The air between the dome and the earthed conductor is an insulator.

Complete the sentence.

Choose the answer from the box.

efficiency	**resistance**	**temperature**

The air between the dome and the earthed conductor has

a high _____.

(1)

The earthed conductor is moved closer to the metal dome.

A spark jumps from the dome to the earthed conductor.

(e) Complete the sentence.

Choose the answer from the box.

earthed	**ionised**	**neutral**

The spark jumps because the air around the charged dome has

become _____.

(1)

(f) Which particles are transferred when the spark jumps from the negatively charged metal dome to the earthed conductor?

Tick (✓) **one** box.

Electrons ☐

Neutrons ☐

Protons ☐

(1)

(g) The potential difference between the metal dome and earth is 300 000 V.

When the spark jumps there is a charge flow of 0.000 002 C.

Calculate the energy transferred by the spark.

Use the equation:

energy transferred = charge flow × potential difference

_____

_____

_____

Energy transferred = _____ J

(2)

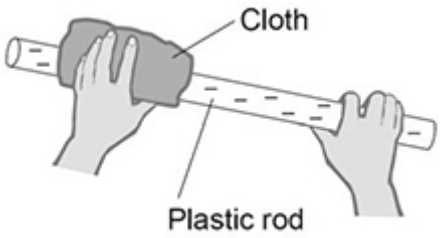
(Total 8 marks)

Q2.

Figure 1 shows a plastic rod being rubbed with a cloth. **(Physics only)**

The plastic rod becomes negatively charged.

Figure 1



(a) Complete the sentences.

Choose answers from the box.

Each answer may be used once, more than once or not at all.

electrons	**neutrons**	**protons**

The plastic rod becomes charged because it gains _____.

The cloth also becomes charged because it loses _____.

(2)

(b) What charge is left on the cloth?

Tick (✓) **one** box.

A negative charge ☐

A neutral charge ☐

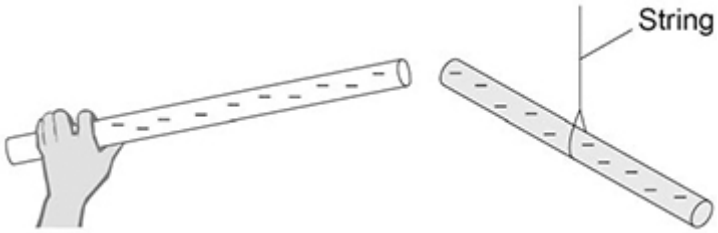
A positive charge ☐

(1)

(c) The negatively charged plastic rod is put near another negatively charged plastic rod that is hanging from a string.

Figure 2 shows the two rods.

Figure 2



What force is exerted on the two rods?

Tick (✓) **one** box.

Give a reason for your answer.

A force of attraction ☐

A force of repulsion ☐

There is no force ☐

Reason _____

_____

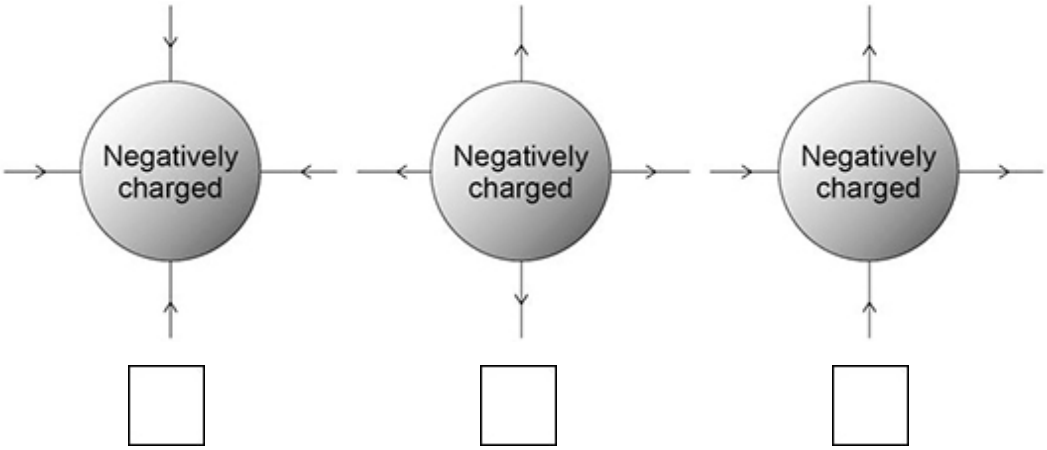
_____

(2)

(d) There is an electric field around any charged object.

Which diagram shows the electric field pattern around a negatively charged sphere?

Tick (✓) **one** box.



(1)

(e) In which position do two charged spheres experience the greatest electrostatic force?

Tick (✓) **one** box.

A

B

C

(1)

(Total 7 marks)