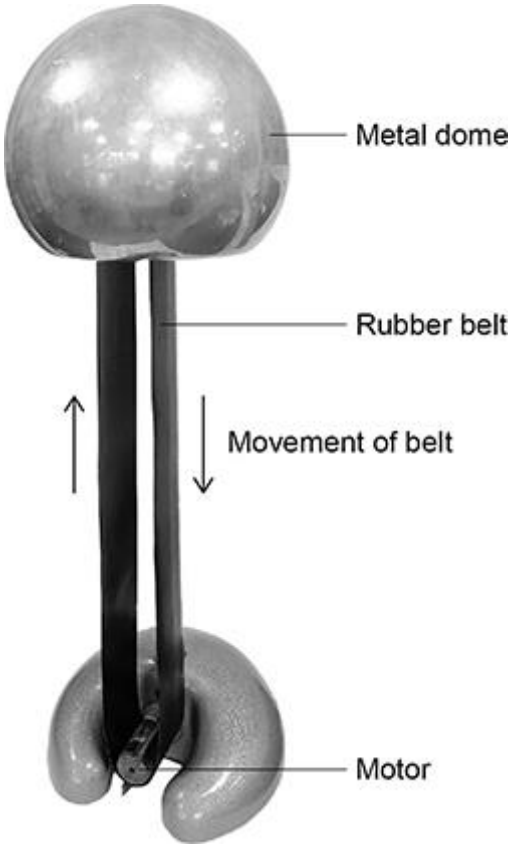
Questions are for separate science students only

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.

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

The dome is negatively charged.

Figure 2

Explain why the student s hair stands up on end.

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(3)

The charged metal dome creates an electric field.

(b) What is an electric field?

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(1)

(c) How does the electric field strength vary as the distance from the charged metal dome increases?

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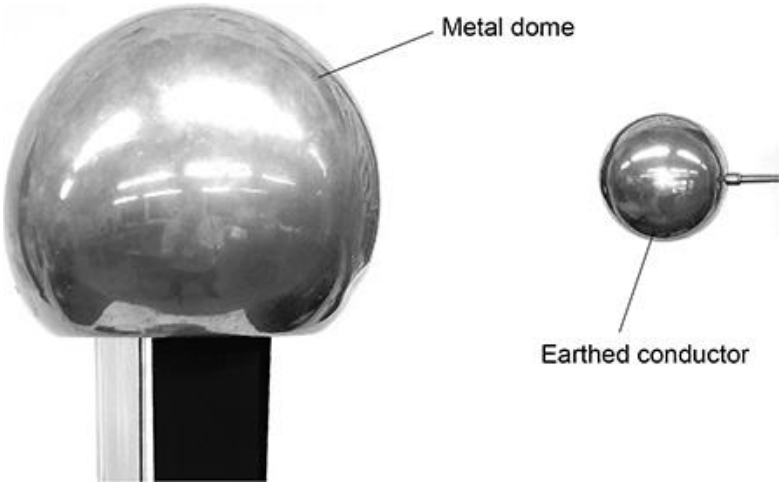
(1)

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

Figure 3



When the earthed conductor is moved towards the metal dome, there is a spark between the dome and the earthed conductor.

(d) The spark transfers 0.60 J of energy, and 2.0 μC of charge is transferred from the dome to the earthed conductor.

Calculate the potential difference between the metal dome and the earthed conductor.

Use the Physics Equations Sheet.

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Potential difference = _____ V

(4)

(e) Which of the following changes would increase the distance a spark can jump between the dome and the earthed conductor?

Tick (✓) **one** box.

Decreased charge on the metal dome	☐
Decreased electric field strength	☐
Decreased electrical resistance of air	☐
Decreased potential difference	☐

(1)

(Total 10 marks)

Q2.

A student rubbed a plastic rod with a cloth. **(Physics only)**

The rod became negatively charged and the cloth became positively charged.

(a) Explain why the cloth became positively charged.

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(3)

Figure 1 shows the negatively charged rod on a balance.

Figure 1

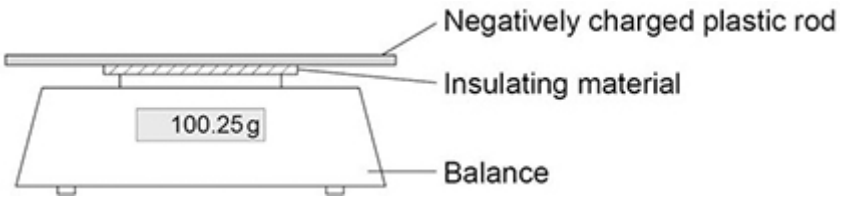
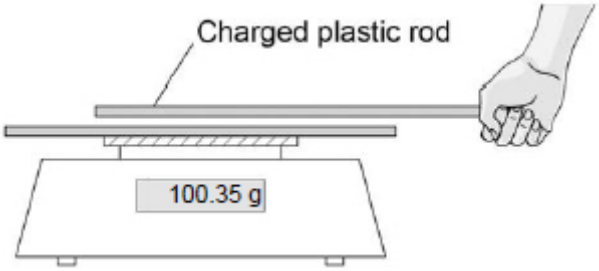


Figure 2 shows another charged rod being held stationary above the rod on the balance.

The rods do not touch each other.

Figure 2



(b) Explain why the reading on the balance increases.

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(3)

(c) The balance had a zero error.

The zero error is not important in this experiment.

Give the reason why.

(1)

(d) A negatively charged rod is held near an earthed conductor.

Explain why a spark jumps between the negatively charged rod and the earthed conductor.

(3)

(Total 10 marks)