

Name of the Student: _____

Max. Marks : 17 Marks

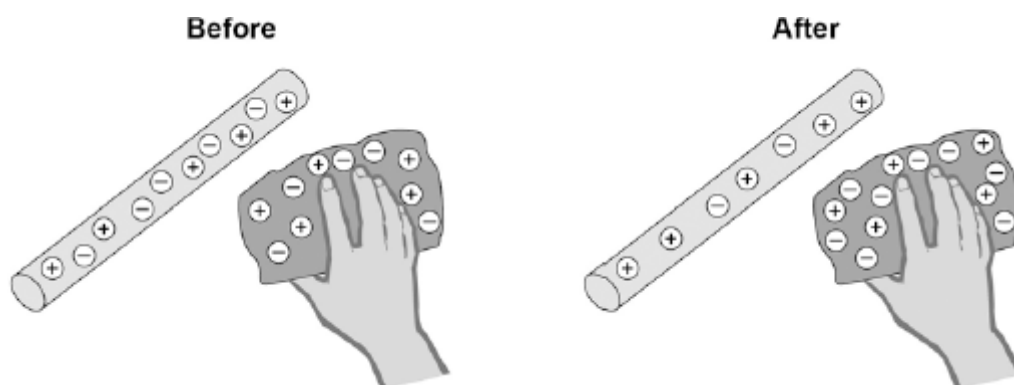
Time : 17 Minutes

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.

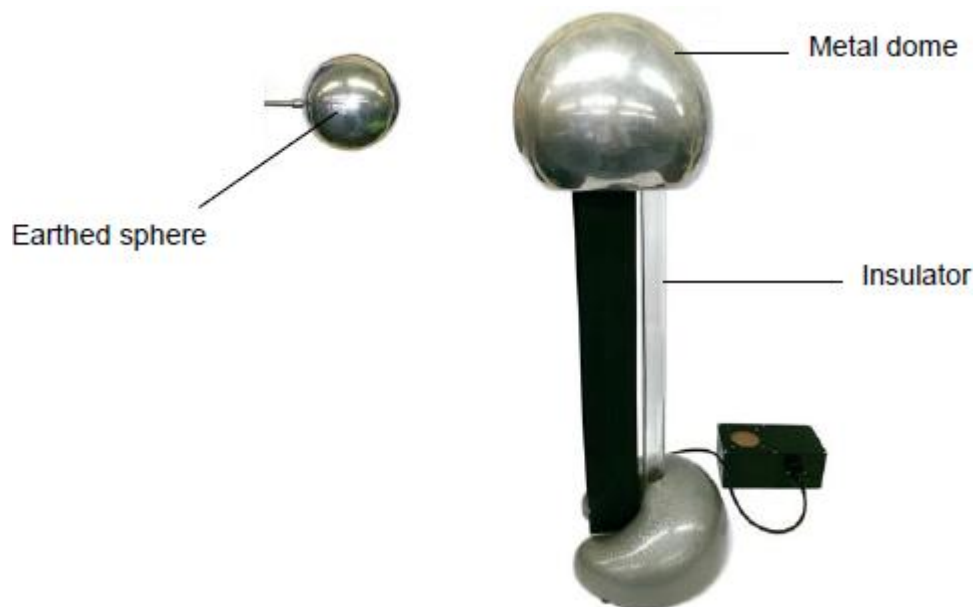
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Give a reason for your answer.

(2)

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

Figure 2



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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:

$$\text{energy transferred} = \text{charge} \times \text{potential difference}$$

Calculate the energy transferred by the spark.

Energy transferred = _____ J

(2)

(Total 9 marks)

Q2.

An electrician is replacing an old electric shower with a new one.

The inside of the old shower is shown in the figure below.



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- (a) The electrician should **not** change the shower unless he switches off the mains electricity supply.

Explain why.

- (b) The new shower has a power output of 10 690 W when it is connected to the 230 V mains electricity supply.

The equation which links current, potential difference and power is:

$$\text{current} = \frac{\text{power}}{\text{potential difference}}$$

Calculate the current passing through the new shower.

Give your answer to two significant figures.

Current = _____ A

(4)

- (c) The new shower has a higher power rating than the old shower.

How does the power of the new shower affect the cost of using the shower?

Give a reason for your answer.

(2)

(Total 8 marks)