**Name of the Student**:_____

**Max. Marks : 21 Marks** **Time : 21 Minutes**

Q1.

Figure 18 shows an aeroplane being refuelled.

The fuel passes through a pipe into fuel tanks in the wings.

The fuel is very flammable.


(Source: © Stanisław Tokarski/123RF)

**Figure 18**

A build-up of static electric charge can be dangerous while the aeroplane is being refuelled.

Explain

- why the build-up of static electric charge would be dangerous
- how the danger is reduced.

**(6)**

**(Total for question = 6 marks)**

Q2.

* Figure 14 shows fuel being transferred to an aeroplane.

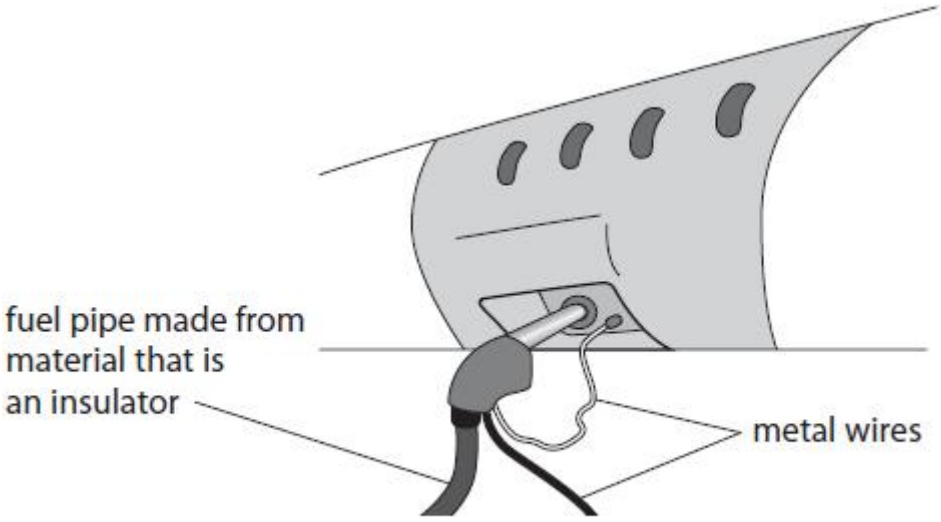


**Figure 14**

Explain why transferring fuel can be dangerous and how the use of metal wires makes the process much safer.

**(6)**

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**(Total for question = 6 marks)**

Q3.

Figure 20 shows two metal spheres.

Metal sphere A is fixed to a table.
Metal sphere B can be moved.

Metal sphere B is placed at a short distance from metal sphere A.

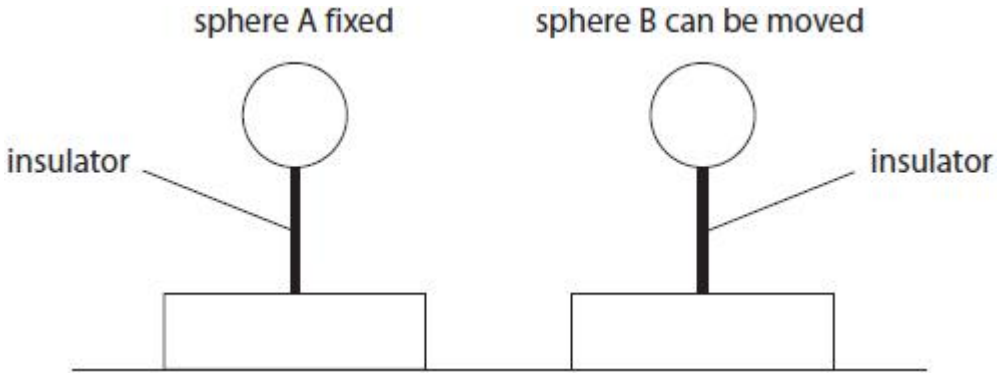


**Figure 20**

Both spheres are insulated from the table and given a negative charge.

The force between the charged spheres is measured.

(i) Explain, in terms of electric fields, why a force is exerted on sphere B.

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(ii) Sphere B is moved and the force between the spheres is measured at several different distances.

Figure 21 is a graph of force on sphere B against distance between the centres of the spheres.

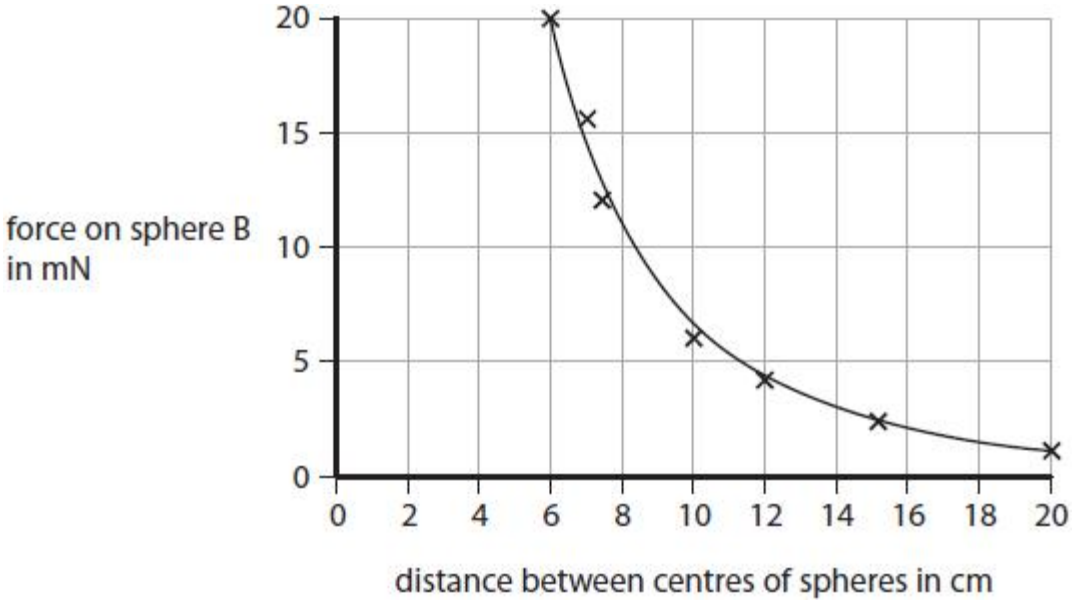


**Figure 21**

Describe how the force on sphere B varies with the distance between the centres of the spheres.

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**(Total for question = 4 marks)**

Q4.

**Answer the question with a cross in the box you think is correct ☒ . If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒ .**

Figure 13 shows a negatively charged metal sphere, M.

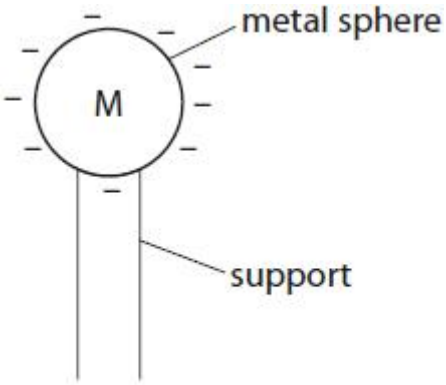


**Figure 13**

(i) Sphere M is negatively charged because it has

**(1)**

- ☒ **A** gained electrons
- ☒ **B** lost electrons
- ☒ **C** gained protons
- ☒ **D** lost protons

(ii) A metal sphere, N, is connected to earth by a wire.

N is moved near to M as shown in Figure 14.

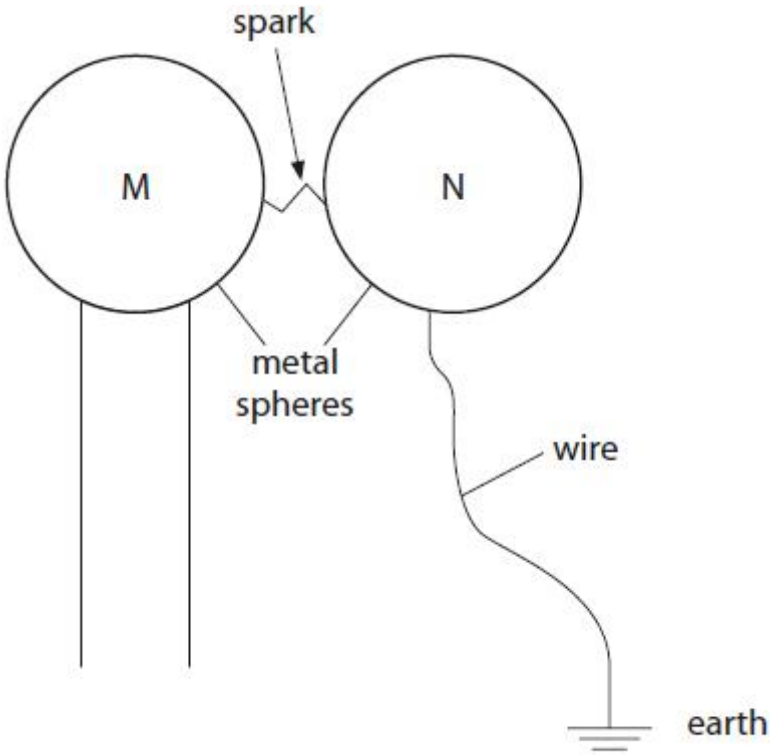


**Figure 14**

A spark jumps between the spheres, discharging sphere M.
Describe what happens in the wire connecting sphere N to earth when the spark jumps between M and N.

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(iii) Describe a use of earthing in everyday life.

Your answer should state the use and describe why earthing is needed.

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**(Total for question = 5 marks)**