ELECTROSTATICS QUESTIONS

NAME: .....

1. (a) A plastic comb is rubbed with a duster.
Small pieces of paper stick to the comb as it gains a charge.

(i) Explain how rubbing the comb with the duster causes it to become charged.

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(2)

(ii) Suggest why the small pieces of paper stick to the charged comb.

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(2)

(iii) Small pieces of paper will **not** stick to a hand held metal comb rubbed by a duster.
Why not?

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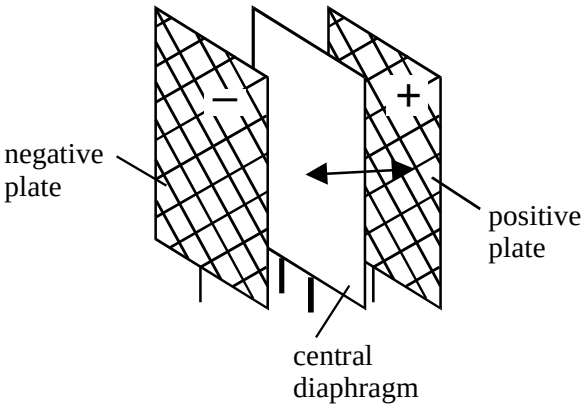
(1)

(b) The diagram shows a loudspeaker that makes use of electrostatic charges.



The output from an amplifier is connected to the central diaphragm.
This causes the charge on the diaphragm to alternate between positive and negative.

(i) Explain why the diaphragm moves.

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(2)

(ii) How does this movement cause sound to be produced?

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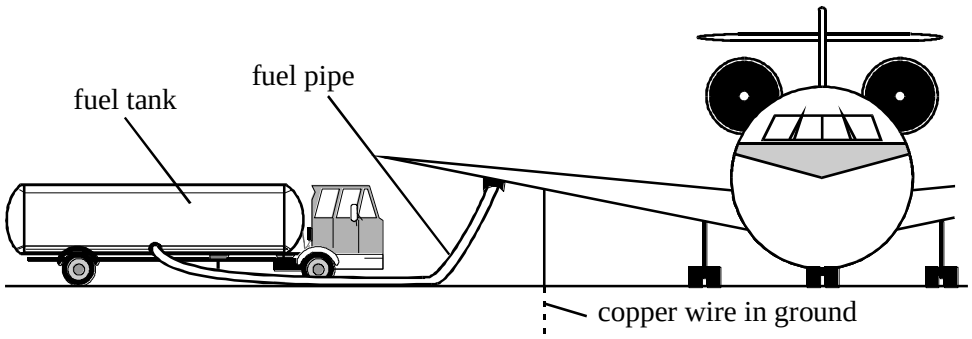
(1)
(Total 8 marks)

2. Electrostatic charge is important when aircraft are refuelled.



(a) Electrostatic charge can build up as fuel is pumped through the fuel pipe. Explain how this happens.

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(2)

(b) Why is the build up of electrostatic charge on the aircraft dangerous?

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(1)

(c) During refuelling a copper wire is attached between the wing and the ground. How does this prevent the build-up of electrostatic charge on the wing?

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(2)
(Total 5 marks)

3. State what happens when

(i) a negatively charged rod is brought up to end A,

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(ii) a positively charged acetate rod is brought up to end A,

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(iii) a positively charged acetate rod is brought up to end B,

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(iv) an uncharged glass rod is brought up to end A.

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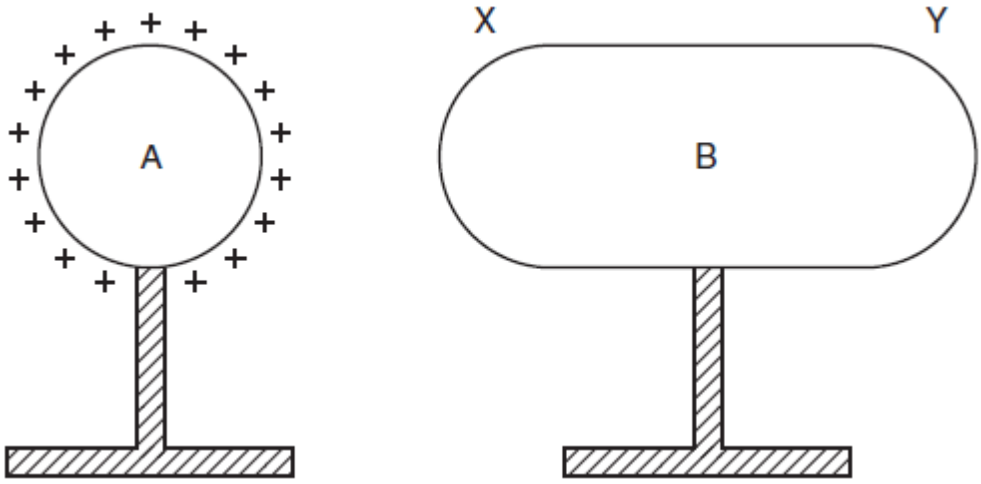
[4]
[Total 5m]

4. In the figure below, A and B are two conductors on insulating stands. Both A and B were initially uncharged.



(a) Conductor A is given the positive charge shown on the figure.
(i) On the figure, mark the signs of the charges induced at end X and at end Y of conductor B.

[1]

(ii) Explain how these charges are induced.

[3]

(iii) Explain why the charges at X and at Y are equal in magnitude.

[1]

(b) B is now connected to earth by a length of wire.
Explain what happens, if anything, to
(i) The charge at X,

[1]

(ii) The charge at Y.

[2]

[Total: 8]

5. (a) A perspex ruler is rubbed with a cloth.
The ruler becomes positively charged.

Explain how it becomes positively charged.

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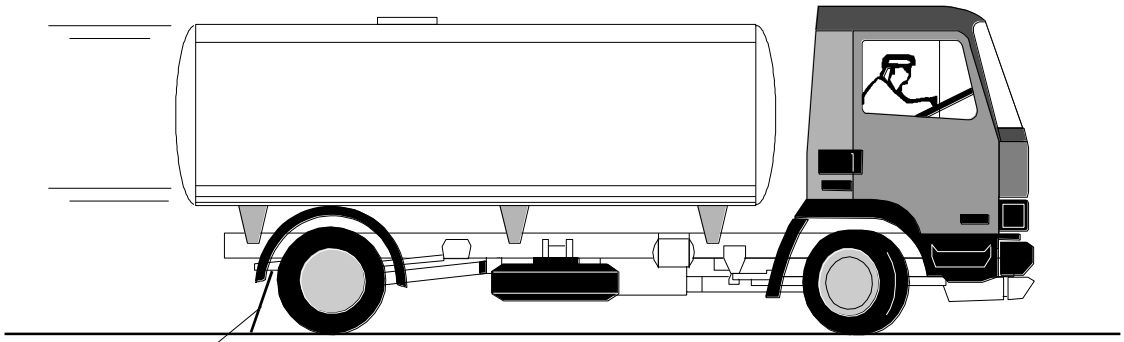
(2)

(b) Static electricity can be dangerous.



For safety reasons, some oil and petrol tankers are fitted with a conducting strip. When the tanker is moving, it is important that the conducting strip is in contact with the ground.

Explain how the conducting strip increases safety.

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(3)
(Total 5 marks)

6. (a) Electrostatic charges can be produced by the process of friction.

(i) Which charged particle is transferred from one material to the other in this process?

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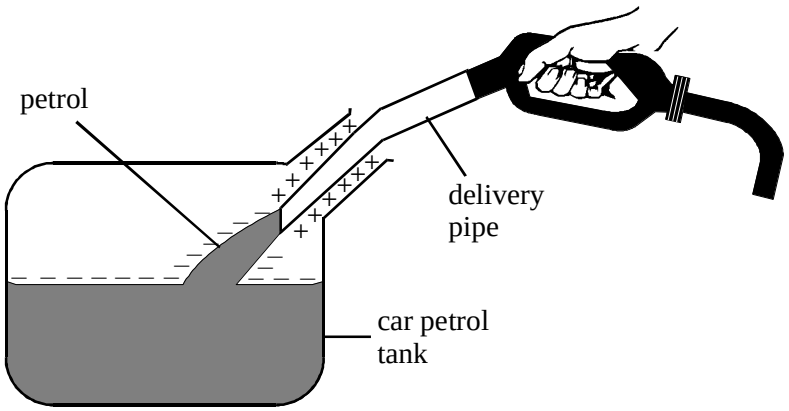
(1)

(ii) When petrol is pumped through pipes, electrostatic charges can build up.



Explain why this is dangerous.

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(2)

(iii) What can be done to prevent the build up of electrostatic charges?

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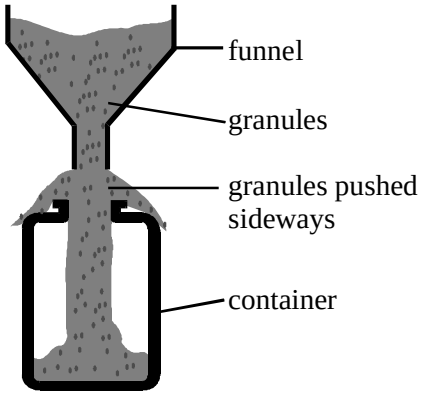
(1)

(b) The diagram shows coffee granules being poured through a funnel into a container. As the granules move through the funnel they gain an electrostatic charge. This causes some of the granules to miss the container.



Explain, in terms of charges, why some of the granules are pushed out sideways and miss the container.

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(2)

(Total 6 marks)