Electrostatics

1. a. Atom
   ![](atom-diagram.png)
   Orbits of electron

   b. i. **Neutral Atom**
       is number of electrons equal number of protons.
   
   ii. **Positive ion / Positive charged**
       is number of electrons less than number of protons.
   
   iii. **Negative ion / Negative charged**
       is number of electrons more than the number of protons.

2. Electrostatics
   a. Is static electricity due to rubbing friction of two different insulators.

   ![Rubbing.png](rubbing-diagram.png)

   Glass    Silk

   b. It becomes **positive charges** when loss of electrons are removed like glass, fur and hair.

   c. It becomes **negative charges** when receive of electrons like silk, polythene, balloon and ebonite or plastic comb.

   ![Unlike charges.png](unlike-charges-diagram.png)
   ![Like charges.png](like-charges-diagram.png)

3. There are two kinds of charges produced by friction:
   a. **Like** charges always repel each other
   b. **Unlike** charges always attract each other
   c. Object that is charged can attract
      i. Neutral objects such as pieces of paper
      ii. Opposite charged objects

   ![Charge diagram.png](charge-diagram.png)

4. Electroscope
   a. To detect small charges
   b. To test the type of charges

   e. The gold leaf will diverge when charged object brought near the brass cap.

   d. The gold leaf will close when the charged object and electroscope have different charges.

   e. The gold leaf will diverge further when charged object and electroscope have same charges.

   ![Electroscope diagram.png](electroscope-diagram.png)

<table>
<thead>
<tr>
<th>Charge brought near</th>
<th>Charge on electroscope</th>
<th>Gold leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>+/−</td>
<td>Neutral</td>
<td>Diverge</td>
</tr>
<tr>
<td>+</td>
<td>−</td>
<td>Close</td>
</tr>
<tr>
<td>−</td>
<td>+</td>
<td>Diverge further</td>
</tr>
<tr>
<td>+</td>
<td>+</td>
<td>Diverge further</td>
</tr>
<tr>
<td>−</td>
<td>−</td>
<td>Close</td>
</tr>
</tbody>
</table>

Neutral object (fire, water, conductor) +/− Close
5. **Everyday phenomenon** related to static electrical charges
   - Spraying paint
   - Lightning
   - Spark plug
   - Aeroplane
   - Lighter
   - Hair stand up when it is combed
   - Petroleum’s lorry tanker

6. **Van de Graf Generator**
   - to generate **high voltage** of electrostatic

   - **Observation**
     the pointer on the galvanometer moves.

   - **Explanation**
     positive charges from the output terminal attract electrons from the earth through the water pipe. This flow of electrons causes the pointer on the galvanometer to move, indicating that electricity is presence.

   - **Conclusion**
     Electricity current is flow of electric charges (electrons ) in one direction.

7. **Measuring electricity**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Ammeter</td>
<td>Ampere (A) to measure current flow of electricity charge</td>
</tr>
<tr>
<td>b. Voltmeter</td>
<td>Volt (V) to measure potential different/voltage</td>
</tr>
<tr>
<td>c. Resistance</td>
<td>Ohm (Ω) to obstruction to current’s flow.</td>
</tr>
</tbody>
</table>
8. **Electric Component and symbols**

<table>
<thead>
<tr>
<th>Type of Generator</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Dry cell</td>
<td>![Symbol]</td>
</tr>
<tr>
<td>b. Ammeter</td>
<td>![Symbol]</td>
</tr>
<tr>
<td>c. Fixed resistor</td>
<td>![Symbol]</td>
</tr>
<tr>
<td>d. Fius</td>
<td>![Symbol]</td>
</tr>
<tr>
<td>e. Voltmeter</td>
<td>![Symbol]</td>
</tr>
<tr>
<td>f. Switch</td>
<td>![Symbol]</td>
</tr>
<tr>
<td>g. Rheostat</td>
<td>![Symbol]</td>
</tr>
<tr>
<td>h. Galvanometer</td>
<td>![Symbol]</td>
</tr>
</tbody>
</table>

### Form 3 Science

#### Chapter 8 Generating of Electricity

1. **Type of generator**
   a. **Thermal generators**
      - Use fuel such as petroleum, gas and coal and other examples such as gas (generator and diesel generator)

   ![Diagram of thermal generator]

   **Chemical** → **Heat** → **Kinetic** → **Electric** energy

   **Potential** energy → **Kinetic** energy → **Electric** energy

   - **Boiler**
   - **Turbine**
   - **Dynamo**
   - **Electric tower**

   ![Diagram of nuclear power plant]

   **Potential** energy → **Kinetic** energy → **Electric** energy

   - **Uranium**
   - **Nuclear reactor**
   - **Steam**
   - **Turbine**
   - **Pump**

   **Non-renewable**
   - Fossil fuel (petroleum, coal, natural gas)

   **Renewable/Alternative**
   - Wind/wave
   - Solar/tides
   - Biomass
   - Charcoal
   - Firewood
   - Geothermal

2. **Gas Turbine**

   ![Diagram of gas turbine]

   **Air filter** → **Compressor** → **Generator** → **Turbine**

   **Non-renewable**
   - Fossil fuel (petroleum, coal, natural gas)

   **Renewable/Alternative**
   - Wind/wave
   - Solar/tides
   - Biomass
   - Charcoal
   - Firewood
   - Geothermal
3. **Electrical supply and wiring system at home** (240 V alternating current)
   a. **Main switch** = cut off or join the current
   b. **Main fuse** = to break/cut off the circuit if there is a leakage, short-circuit or large current
   c. **Electric meter** = to record the amount of energy used
   d. **Fuse box** = same as main fuse
   e. **All the electrical circuits in a house are connected in parallel.**
      i. Each electrical appliance can be switched on and off independently
      ii. A fault in any circuit will not cause a fault in other circuits.
   f. **There are two types of wiring circuits at home:**
      i. Lighting circuit
      ii. Power circuit

4. **Integrated circuits are used in**
   - computers
   - handphones
   - calculators

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**FORM 3 SCIENCE**

**CHAPTER 9 STAR AND GALAXIES**

1. **The Sun**
   - The sun is at the center of the Solar System.
   - The huge mass of the Sun causes it to have a large force of gravity. This causes all other objects in the Solar System to orbit around it.

2. **The Universe**
   i. The Universe consists of billions of galaxies.
   ii. All the galaxies in the Universe are constantly moving away from each other.

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**FORM 3 SCIENCE**

**CHAPTER 10 SPACE AND EXPLORATION**

- No notes