**ST. JOSEPHS SENIOR SECONDARY SCHOOL NAGGALAMA**

**S.4 PHYSICS EXERCISE II**

**BY Kyaaka Fred**

**ELECTROSTATICS**

***REFERENCES;***

* ***Physics, fifth.edition by A.F.ABBOTT***
* ***The world of PHYSICS, second.edition by JOHN AVISON***
* ***Physics of today and tomorrow by TOM DUNCAN***

1. (a) (i) State the fundamental law of electrostatics.

(ii) Explain the difference between **electric** conductors andinsulators.

(b) (i) What is meant by **electrostatic induction**?

(ii) Explain the **four** uses of a gold leaf electroscope.

(c) Describe how an electroscope is used to test whether a body is a good conductor or good insulator.

1. (a) What is meant by **charging a body by contact**?

(b) Describe how a body can be charged;

(i) positively by contact

(ii) negatively by contact.

(c) Explain the charging of an insulator by friction.

(d) Describe how a body can be charged ;

(i) negatively by electrostatic induction

(ii) positively by electrostatic induction.

(e) Explain why when charging a body, Earthing is broken in presence of a charged rod.

(f) Explain why **increase** in divergence of the leaf of a gold leaf electroscope is the **only** sure test for the sign of charge on the body.

1. (a) What is meant by a **Gold leaf electroscope**?

(b) Describe how a gold leaf electroscope can be charged;

(i) positively.

(ii) negatively.

(c) Describe an experiment to show that charge does not reside inside a hollow conductor (ice-pail experiment).

(d) Describe the Faraday’s butterfly net experiment.

(e) No charge on the inside surface of a hollow charged conductor. Show this using Coulomb’s hemispheres.

(f) State the precautions taken when performing electrostatic experiments.

1. (a) (i) How do objects become charged?

(ii) Where does charge come from?

(b) Explain what happens when you bring a charged plastic object such as a comb close to the stream of water from a slow running tap.

(c) How does a balloon, rubbed on your sleeve, stick to a wall or ceiling?

(d) In dry weather, when a driver touches the door before getting out of her car, she sometimes gets an electrical shock as soon as her foot touches the ground.

(i) Explain why this happens.

(ii) Why does it not happen in wet weather?

(e) Explain what happens when a strong negative charge is brought near to the cap of a positively charged electroscope.

1. (a) (i) Define **charge density.**

(ii) What is meant by **corona discharge**?

(iii) State **three** applications of corona discharge/ action of points.

(b) Describe how the lightning conductor safeguards a building.

(c) Explain what is observed when a positively charged wire point is placed close to a candle flame.

(d) Describe an experiment to show that a **candle flame** contains both positive and negative ions.

1. (a) (i) What is an **electric field**?

(ii) State **three** properties of electric field lines.

(iii) What is meant by a **neutral point** as applied to electric fields?

(b) Sketch electric field lines due to;

(i) two opposite point charges placed near each other

(ii) two like point charges placed near each other

(iii) two parallel metal plates with opposite charge placed near each other.

(c) A positively charged metal sphere was gently lowered in a hollow cylindrical can. Sketch electric field lines when the sphere;

(i) does not touch the inside walls of the can

(ii) touches the inside walls of the can.

**END**