

4. Explain the nature and cause of the thermotic changes, when Ammonic Nitrate is put into water,—water is mixed with alcohol,—water is added to quicklime,—a gas is suddenly allowed to expand.
5. Give illustrations of Potential and Kinetic energy. What is the mechanical equivalent of heat, and how is it found?
6. Explain the character and method of production of an absorption spectrum.
7. Give the composition of the atmosphere, and prove that it is a mechanical mixture.
8. Obtain Carbon Dioxide and describe it. How is it changed into Carbon Monoxide?

SECOND PAPER.

9. Describe the structure of a common flame, and thence explain the action of the blowpipe—of “*Bunsen’s burner*.”
10. Describe Iodine, and explain how it in any way becomes a test for the presence of Chlorine.
11. State how you could obtain,—*Acetic Acid, Phosphorus Potassic Hydrate, Chrome Yellow, Rouge, Soluble Prussian Blue*.
12. Symbolize the changes, and name the products when,—

*Alcohol* is boiled with *Sulphuric Acid*.

*Copper* is boiled with *Sulphuric Acid*.

*Arsenic* is heated in *Air*.

*Sodic Amalgam* is put into solution of *Ammonic Chloride*.

*Manganic Dioxide* is heated with *Potassic Chlorate*.

13. What common applications have,—*Potassic Nitrate, Carbon Disulphide, Borax, Calcic Sulphate, Cupric Oxide, Alum*?
14. Describe any common battery that does not evolve Hydrogen, and show what becomes of that gas.

NATURAL SCIENCE.

BOTANY AND ZOOLOGY.

1. Describe the structures or processes denoted by the terms: *Parenchyma, Alburnum, Conjugation, Stoma, Aril, Differentiation*.