

The most important properties of carbon, sulphur, phosphorus, and sulphuric acid; the preparation and properties of the oxides of carbon, sulphur dioxide, chlorine, ammonia, hydrochloric acid and nitric acid.

An elementary experimental study of limestone, quicklime, slaked lime, washing-soda, caustic soda, common salt, and copper sulphate.

The candidate will be expected to show that he has acquired by actual experiment, observation, and measurement his knowledge of the matters set forth in the above syllabus; but he will not be expected to show that he is familiar with other than the simple apparatus and appliances commonly used in connection with elementary instruction in practical chemistry in secondary schools. He will be required to forward, before the date of examination, a certificate in the prescribed form that he has carried out satisfactorily a course of practical work based on the syllabus.

(5) *Magnetism and Electricity.*

Properties of magnets; methods of making magnets; induction; elementary notions of the magnetic field and lines of force; the earth as a magnet; dip; declination; mariner's compass.

Electrification by friction and by induction; conductors and non-conductors; the gold-leaf electroscope and its use; distribution of electrification on conductors; hollow conductors; the electrophorus.

Elementary notions of the electric current, of the means of producing it, of its magnetic, heating, and chemical effects; water and silver voltameters; elementary notions of electromotive force and resistance; Ohm's law; electrical units (ampere, volt, ohm, watt, Board of Trade unit).

The galvanometer, its use in detecting changes in the strength of a current and in comparing (roughly) the strength of different currents and the resistances of different conductors; ammeters and voltmeters (treated simply); the resistance-box.

Electromagnet; electric bell; glow-lamp.

Very elementary ideas of electro-magnetic induction.

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(6) *Technical Electricity.*

Simple experiments with compass and magnet.

Elementary magnetic properties of iron and steel. An elementary study of magnetic fields and lines of force.

The Leclanche cell. Magnetic field about a wire carrying a current. Solenoids and electromagnets. The electric bell. The relay, the telegraph, and the telephone.

Practical units of current, quantity, electromotive force, resistance, power and energy. Laws of resistance. Use of Ohm's law for simple circuits.

Heating effect of an electric current treated quantitatively. Heaters, hot-wire instruments, and fuses. Electric lamps.

Principles underlying construction and use of ammeters and voltmeters (moving-iron and moving-coil).

Production of electro motive force by change of magnetic flux through an electric circuit. Simple application of principle to direct-current generators and motors.

Very elementary ideas of the alternating current, including its employment for experimental work in simple non-inductive circuits, within the limits of the above syllabus. Practical use of the transformer.

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(7) *Heat and Light.*

Experiments to illustrate the expansion of solids, liquids, and gases (qualitatively). Measurement of expansion of solids and liquids. Practical applications of the principle of expansion. Mercury and alcohol thermometers. Maximum and minimum thermometers. The anomalous expansion of water and its significance.