THE EFFECTS OF AN ELECTRIC CURRENT

The effects of an electric current are **thermal**, **luminous**, **chemical** and **magnetic**. When a current flows through a conductor **it may heat the conductor**. This heat is sometimes undesirable and has to be reduced. For this reason many electric motors and generators contain **a fan**. However, domestic appliances, such as electric cookers, and many industrial processes depend on the heating effect of an electric current. The passage of a current **may produce light**. This can happen in a number of ways. The heat generated by the current may be so great that the conductor becomes **incandescent**. For example, the filament of a light bulb emits intense white light when heated by a current. Light is also produced when a current ionizes a gas. The colour of the light will vary according to the gas used. Mercury vapour lamps give a greenish-blue light. An electric current can separate a chemical compound into its components. This is called **electrolysis**. Chlorine is generated by the electrolysis of salt water. Electrolysis can also be used to break down water into hydrogen and oxygen. Because pure water does not conduct well, sulphuric acid has to be added before the electrolysis takes place.

A current flowing through a conductor creates a magnetic field around it. This field has three applications. It can magnetize magnetic materials and attract them to the conductor. The electric relay works on this principle. If the magnetic field is cut by another conductor, an electromotive force will be induced in that conductor. For instance, the change in current flowing through the primary of a transformer will induce a current in the secondary. This principle is also used in generators. Thirdly, if a current-carrying conductor is placed in the magnetic field, a force will be exerted on it. This effect is utilized in the electric motor.

**TERMS AND DEFINITIONS**

**incandescence** – emission of visible radiation by a heated object, such as a lamp filament heated by electric current

**ionization** – a process by which a neutral atom or molecule loses or gains electrons, thereby acquiring a net charge and becoming an ion; it can be produced by collision of particles, i.e. by collisions between electrons and residual gas molecules in an electron tube (=ionization current or gas current), by radiation, and by other means

**electrolysis** – the production of chemical changes by passing current from an electrode to an electrolyte, or vice versa

**primary winding** – symbol P, the transformer winding that receives signal energy or AC power from a source; also called primary

**secondary winding** – symbol S, a transformer winding that receives energy by electromagnetic induction from the primary winding. A transformer may have several secondary windings, and they may provide AC voltages that are higher, lower, or the same as that applied to the primary winding; also called secondary.

**electromagnetic induction** – the production of a voltage in a coil by a change in the number of magnetic lines of force passing through the coil 24

*DISCUSSION QUESTIONS*

1. What effects does an electric current produce?

2. What happens when an electric current passes through a conductor?

3. Why does the heat produced by an electric current have to be reduced and how can it be reduced?

4. Why does the conductor become incandescent when the current passes through it?

5. What happens when a current ionizes a gas?

6. What is electrolysis?

7. What does a current flowing through a conductor create around it?

8. What are the three applications of the magnetic field?

SCRAMBLED SENTENCES (begin the sentence with the word in a capital letter):

1. through, causes, changes, a liquid, current, The passage of, an electric, chemical

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2. current, Hans Christian Oersted, was, The magnetic, discovered, by, in, effect of, 1820, an electric,

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3. electrolysis, application of, Electroplating, a common, is,

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4. electric motors, voltmeters, many, current, electromagnets, applications, loudspeakers, effect of, an electric, has, The magnetic, e.g., etc.

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5. explains, current, Ohm’s, the relationship, voltage, existing, Law, between, resistance, and

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6. Ohm’s Law says: a circuit, proportional, voltage, The current, in, directly, proportional, is, resistance, and, to the amount of, inversely, of, to the applied

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7. around, When, a magnetic, current, through, formed, a wire, flows, the wire, around, is, field

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8. Joule effect is, effect, by the flow of, through, a resistance, the heating, of current, produced,

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9. containing, heat, in a circuit, resistors, current, in, An electric, generates

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