1. **Прочтите и переведите текст.**

ELECTRICAL MEASURING INSTRUMENTS

**General Electrical Principles**. To measure the **magnitude** of any phenomenon calls for the use of the effects produced by it. For the **measurement** of a mass, for example, we **determine** its **weight**; or we might **utilize** the force required to give it a certain **acceleration**. Again, for the measurement of **temperature** we use the expansion of solids, liquids, or gases, the change in **electrical** resistance of a wire, or the **thermo-electromotive** force produced at the junction of two conductors, etc. For the everyday measurement such indicating instruments are most convenient, in which the amount of the **quantity** to be measured is **directly** shown by the position of a **pointer**on a graduated scale or dial.

For the production of such instruments, some effect is employed which enables the phenomenon to be measured to produce a mechanical force tending to move the pointer along its scale; this is resisted by a controlling force which tends to move the index in the opposite direction, towards some zero position. The actual **displacement** of the index, or deflection, is the resultant of these two forces, and is greater the greater the magnitude of the **deflecting**force or of the phenomenon to be measured.

As a matter of fact, one single principle is known to underlie all **electromagnetic** instruments, viz. that the current-carrying circuit tends to enclose as large a magnetic field as **possible**. In the moving needle **galvanometers** the magnetic needle turns so that more of its lines or force pass through the coil, while in the moving coil instrument the coil sets itself so as to enclose as much of the field of the magnet as possible. In the soft iron instruments the iron moves so as to increase the magnetic flux produced by the coil, and in the dynamometer the moving coil turns so that its magnetic effect increases that of the fixed coil. Should the conducting circuit be made **entirely** of flexible material in a uniform field, it would become **circular** in order to enclose the maximum possible area, while, if the current flowed in a liquid **conductor** – such, for instance, as mercury – it would actually try to reduce its section so as to shorten the path of the lines of force around it. To such an extent is this the case that is difficult to pass a large current along such a conductor owing to the **tendency** of the mercury to contract and break the circuit.

**2. Прочтите и выучите:**

measure – измерять

determine – определять, устанавливать

utilize – использовать

thermo-electromotive force – термоэлектрическая сила

pointer – стрелка

dial – шкала

displacement – смещение

viz. – а именно

magnetic flux – магнитный поток

uniform field – однородное поле

mercury – ртуть

**3. Прочтите текст и, основываясь на его содержании, заполните таблицу.**

construction

operation principle

usage

ammeters

voltmeters