TEXT I

amount	величина, количество
capacitance	емкость
capacitor	конденсатор
inductance coil	катушка индуктивности
conductor	проводник
medium	среда
plate	обкладка (конденсатора)
property	свойство
unit	единица (измерения)
value	величина
affect	воздействовать, влиять
store (syn. accumulate)	накапливать,
unidirectional	аккумулировать
approximately	однонаправленный
because of	приблизительно
buildup	из-за, вследствие
	накопление

Passive Elements of a Circuit (~ 4060)

(1)Let's begin by looking[1] at how the key passive elements found in most electronic circuits work.

(2)A *passive element* is considered to be an electrical component that does not generate power, but instead dissipates, stores, and/or releases it. (3)Passive elements include resistors, capacitors, and coils (also called[2] inductors). (4)In most circuits, they are connected to active elements, typically semiconductor devices such as amplifiers and digital logic chips.

(5)A passive component of a circuit is an electronic component containing[3] no source of power, in contrast to active components. (6)Resistance, capacitance and inductance are considered to be important properties of an electric circuit.

(7)The property of an electric conductor to dissipate[4] energy is termed *resistance*. (8)Resistance is said to depend upon a number of factors: size and shape of a conductor and the material used. (9)The larger the length of wire, the greater its resistance. (10)The resistance of any given type of a conductor varies directly with its cross-sectional area. (11)Resistance is known also to be affected by the temperature of the conductor. (12)The unit of resistance is ohm.

(13)*A resistor* is a primary type of physical component that is used in electronic circuits. (14)Resistor is an electric device possessing resistance. (15)Every resistor has a certain amount of inductance and capacitance associated with it.

(16)It has two (interchangeable) leads. (17)The material placed[5] internally between the two leads of a resistor opposes (restricts) the flow of current. (18)The amount of that opposition is called its resistance, which is measured in ohms (Ω). (19)Resistors are used to control[6] the various currents in areas of a circuit and to voltage levels at different points therein by producing[7] voltage drops. (20)When a voltage is applied across a resistor, current flows through it.

(21)Ohm's law for resistors is E = IR, where E is the voltage across the resistor, R is the resistance of the resistor, and I is the current flowing through the resistor. (22)That current is proportional to the applied[8] voltage, and inversely proportional to the resistance. (23)Thus, as resistance goes up, the current through the element comes down, so that at high resistances the current is very small.

(24)Ohm's law makes it possible to calculate[9] any one of three circuit values (current, voltage, or resistance) from the other two.

(25)*A capacitor* proved to be another primary type of physical component used in electronic circuits. (26)It has two leads and is used to store and release electric charge. (27)A capacitor's ability to store[10] charge is referred to as its capacitance, measured in farads (F).

(28)Capacitance is always present because of the capacitance between terminals, between various parts of a resistor and terminals, and between parts of the resistor.

(29)The property of a conductor to accumulate electric charge is termed[11] capacitance. (30)Devices possessing the “capacity” to store a charge are called capacitors. (31)The general form of a capacitor is that of two parallel conducting plates, containing[12] between them a non-conducting medium called dielectric. (32)Common dielectrics are air, glass, oil and waxed paper.

(33)Capacitance is measured in farads, microfarads and picofarads. (34)A capacitance of one farad is very large and for practical purposes not used. (35)The microfarad is more convenient.

(36)A typical capacitor takes the form of two conductive plates separated by an insulator (dielectric). (37)This type of circuit elements cannot pass direct current (DC) because electrons cannot flow[13] through the dielectric. (38)However, a capacitor does pass alternating current

(AC) because an alternating voltage causes the capacitor to repeatedly charge and discharge, storing[14] and releasing energy. (39)Indeed, one of the major uses of capacitors is to pass alternating current while blocking direct current.

(40)When a direct current flows into a capacitor, a positive charge rapidly builds up on the positive plate and a corresponding negative charge fills the negative plate (see Figure 1).

(41)The buildup continues until the capacitor is fully charged—i.e., when the plates have accumulated as much charge (Q) as they can hold[15]. (42)This amount is determined by the capacitance value (C) and the voltage applied across the component: (Q = CV). (43)At that point, current stops flowing (see Figure 2).

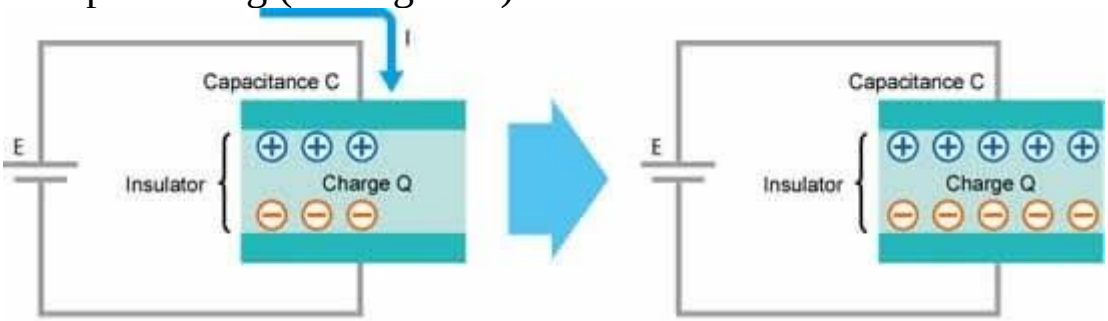

Figure 1: The capacitor is charging / Figure 2: The capacitor is charged (and stable)

(44)The *inductance* is known to be the property of an electric circuit that opposes a change in the value of the current. (45)Inductance depends on the physical characteristics of the conductor. (46)Inductance is measured in Henrys.

(47)*An inductance coil* is also considered to be an important component of a circuit. (48)Induction coil is a device using electromagnetic induction to produce a series of pulses of high potential and approximately unidirectional current.