**TEXT I**

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

**Passive Еlements of a Circuit (~ 4060)**

(1)Let's begin by looking1 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 called2 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 containing3 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 dissipate4 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 placed5 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 control6 the various currents in areas of a circuit and to voltage levels at different points therein by producing7 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 applied8 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 calculate9 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 store10 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.

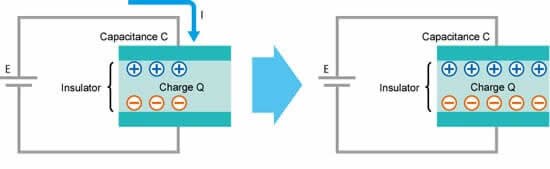
(29)The property of a conductor to accumulate electric charge is termed11 capacitance. (30)Devices possessing the “capacity” to store a charge are called capacitors. (31)The general form of a capacitor is that of two parallel conducting plates, containing12 between them a non-conducting medium called 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 flow13 through the dielectric. (38)However, a capacitor does pass alternating current (AC) because an alternating voltage causes the capacitor to repeatedly charge and discharge, storing14 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 hold15. (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.