To Identify a Diode, An LED, a Transistor, An IC, a Resistor & a Capacitor From a Mixed Collection Of Such Items

Aim

To identify a diode, an LED, a transistor, an IC, a resistor and a capacitor from a mixed collection of such items.

Apparatus and material

Apparatus: Multimeter.
Material: Above mixed collection of items.

Theory

For identification, appearance and working of each item will have to be considered.

1. A diode is a two terminal device. It conducts when forward biased and does not conduct when reverse biased. It does not emit light while conducting. Hence, it does not glow.
2. A LED (light emitting diode) is also a two terminal device. It also conducts when forward biased and does not conduct when reverse biased. It emits light while conducting. Hence, it glow.
3. A transistor is a three terminal device. The terminals represent emitter (E), base (B) and collector (C).
4. An IC (integrated circuit) is a multi-terminal device in form of a chip. [See figure (UM 3482 IC Tone Generator)]
5. A resistor is a two terminal device. It conducts when either forward biased or reverse biased. (Infact there is no forward or reverse bias for a resistor). It conducts even when operated with A.C. voltage.
6. A capacitor is also a two terminal device. It does not conduct when either forward biased or reverse biased. When a capacitor is connected to a D.C. source, then multimeter shows full scale current initially but it decay to zero quickly. It is because that initially a capacitor draw a charge.
   The components to be identified are shown in figure.

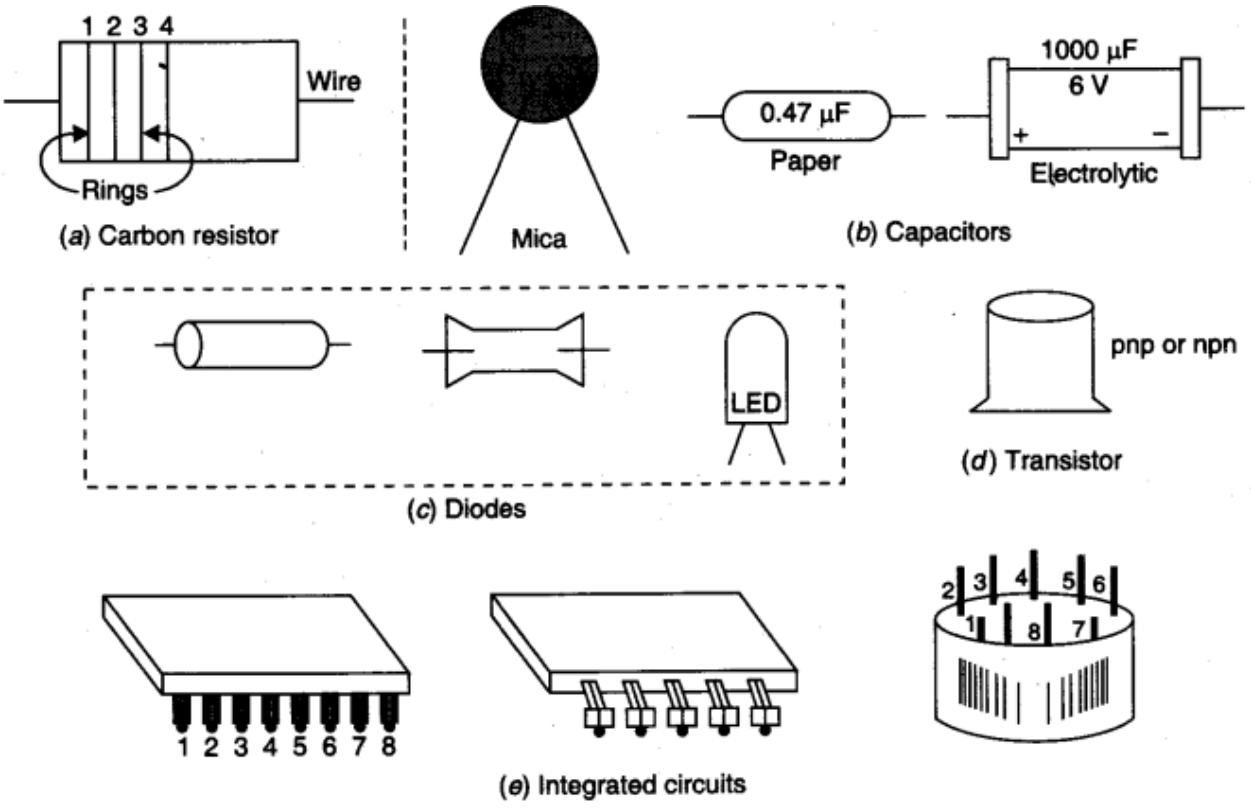

Fig. Some of the commonly available integrated circuits (ICS).

Procedure

1. If the item has four or more terminals and has form of a chip, it is an IC (integrated circuit).
2. If the item has three terminals, it is a transistor.
3. If the item has two terminals, it may be diode, a LED, a resistor or a capacitor. To differentiate proceed as ahead.
4. Put the selector on resistance R of Multimeter for checking the continuity. The probe metal ends are inserted in terminal marked on the Multimeter as common and P (or + ve).

If such that the black one is in common and red probe is in P (or + ve). On touching the two ends of the device to the two other metal ends of probes.

1. If pointer moves when voltage is applied in one way and does not move when reversed and there is no light emission, the item is a diode.
2. If pointer moves when voltage is applied in one way and does not move when reversed and there is light emission, the item is a LED.
3. If pointer moves when voltage is applied in one way and also when reversed, the item is a resistor.

4. If pointer does not move when voltage is applied in one way and also when reversed, the item is a capacitor.

Observations

No. of Obs.	*Number of legs*	*Name of device*	*No. of Obs.*	*Possible current flow*	*Name of device*
1.	More than 3	IC	4.	Unidirectional emit no light	Diode
2.	Three	Transistor	5.	Unidirectional emit light	LED
3.	Two	Capacitor, Diode, LED or resistor	6.	Both direction (steady)	Resistor
			7.	Initial high but decays to zero	Capacitor