Technical English  First semester

The vacuum tube: It is the basis of many applications like diode, and transistors depending on the principle of heating a metal to increase the thermal motion of the electrons as heating is a kind of energy the free electrons need. This emission of electrons can most suitably be made to take place in a vacuum to prevent the oxidation of the very hot metal and to allow the electrons to come out freely. i.e. without colliding with the ions of the air.

Any vacuum tube consists of a glass or metal envelope in which there are two or more terminals or electrodes that may carry or control the current within the tube. The tube may be highly evacuated or it may contain an inert gas such as argon.

The simplest kind of vacuum tube is the diode consisting of two electrodes: the cathode and the anode. The a.c. current is rectified to a d.c. current during its passage from the cathode to the anode. Sometimes another electrode is added between the two electrodes and so the vacuum tube is called triode. The triode is both a rectifier and an amplifier.

By adding another electrode to the triode the transistor is called tetrode which it has an increased amplification capacity.

Grammar points and formula like the simple present.

Semiconductors: Certain elements called semiconductors offer resistance to electric current. This resistance can be vary widely by the addition of heat energy, light energy, or impurities that are added to increase the number of charge carriers. By these impurities we can obtain either N.type crystal or P.type crystal of semiconductors i.e. either donor crystal or acceptor one.

By joining a P.type section of semiconductors to a section of an N.type, a PN junction is made and such a device is called a solid-state diode to distinguish it from a vacuum tube diode in which the free electrons move through a vacuum. If the PN junction is connected in the proper direction, a current flows readily and the junction is said to be forward biased. But if we reverse the battery connection, no current flows in the case of transistors except in the case of zener diodes and so the junction is said to be reversed biased.

The transistor which in its simplest form is a three terminal solid state device is made from semiconductors materials placed between two N type semiconductors and is called NPN transistor. Or a thin layer of N type is put between two P type semiconductors and in this case we obtain a PNP transistor. Like any triode, a transistor has three electrodes: the base which controls the current, the collector which collects the emitted electrons and the emitter that emit the electrons.

There are advantages of transistors over vacuum tubes in the sense that they are solid so they require no vacuum for the flow of electrons. They also can be made very much smaller than
those using vacuum tubes. Transistors make no use of heat as does a vacuum tube to emit electrons and so they work without the warm up period unlike the vacuum tube that needs a minute or two to warm up and starts working.

The **photoelectric cell**: It was found that visible light falling on a surface coated with a metal causes the emission of the free electrons of the metal. The more intense the light, the more electrons will be emitted. The photoelectric cell consists of a cathode which consist of a half cylinder of metal coated with a thin layer of some sensitive metal like potassium. The anode is usually a thin metal rod lying along the central axis of the cathode. Both electrodes are enclosed in a glass envelope from which air is evacuated to prevent corrosion.

Now if the cell is to operate on visible light, the cell is covered with a shield except for a small window facing the inner surface of the cathode, there is a flow of electrons to the anode, thus causing a current to flow through the circuit.

The photoelectric cell is used in most of the instruments that are operated by light, such as television and cinema projects. It can be used in automatic counting machines. For example, suppose we want to count the number of cars passing a certain spot on road. A photoelectric cell is mounted on one side of the road enters the transparent window of the cell and strikes the cathode. Electrons are emitted and the flow of current is amplified until it is large enough to close a magnetic relay. As the car interrupts the beam of light, the cell is illuminated again and the relay closes, preparing for the next car to pass. Clearly, the same arrangements can be used to count other objects on a moving conveyer belt as they pass in front of the cell.

The simple present tense is used to talk about facts and truths or routine habits that is done usually.

Ex. The earth goes round the sun.

The simple past is used to talk about actions that has happened and finished in the past.

Ex. The students went to the cinema yesterday.

The present perfect is used to talk about an action that has happened and finished in the past but its result is still obvious in the present.

Ex. She has painted the house recently.

The present continuous is used to talk about an action that is continuous for a limited time.

Ex. I am writing a letter now.

The past continuous is used to talk about an action that continued foe a limited time in a point in the past.

Ex. The boy was playing piano for two hours.