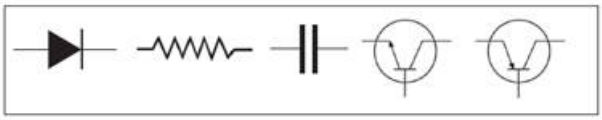
7. Electronics and modern technology

Let us Assess

1. Question



(a) Identify the components depicted here and write them down.

(b) Which is the electronic component that does the function of all these components?

(c) What are the advantages of this component?

Answer

(A). Identification of the compound:-

1. 

The given components is Diode. It is a semiconductor device which is consisted of two parts formed by suitable doping of two different type of semiconductor material i.e. p-side and n-side.

2. 

The given component is resistor. It is a device which stops or resist the flow of current.

3. 

The given component is capacitor. It is a device which store the charge or we can say electrical energy and provide that electrical energy in times of need.

4. 

This is a n-p-n transistor which is consisted of three parts, emitter, base and collector. The function of this type of transistor is to amplify any small Ac current which is applied to its base part.

5. 

This is a p-n-p transistor which is consisted of three parts, emitter, base, and collector. This type of transistor work as a current regulator by allowing only limited and precise amount of current from a source of larger current.

(b). The electronic component which does function of all the above mentioned components is IC chips.

An IC chip stands for Integrated Circuit chips which is an arrangement of lots of transistors, diodes, resistor, capacitors, etc. It does incorporate the function of many parts in a semiconductor chip.

(c). The advantage of IC chips:

•Minimize the size of electronic devices.

•High efficiency.

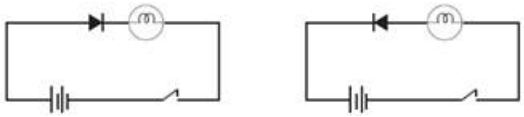
•Credibility.

•Low energy consumption.

•High longevity/ Last longer than any other devices.

•Resist the temperature change hence not creating over heating problems.

2. Question



(i) In which circuit will the lamp glow when switched on?

(ii) What is the function of a diode?

Answer

(i). The first case where p-side of the diode is connected to the positive terminal of the battery and n-side to the negative terminal of the body is the circuit in which the lamp glow when switched on. While in the second the exact opposite happens the p-side is connected to the negative terminal ad n-side connected to the positive terminal and the lamp will not glow. This happens so because when we connect p-side of the diode to the positive terminal of the body the diode behaves as a conductor and allows the current to flow and this is called forward biasing but when it is connected in opposite direction the diode will behave as a resistor and this is called reverse bias.

(ii). The diode is a semiconductor device which is consisted of two parts formed by suitable doping of two different type of semiconductor material i.e. p-side and n-side.

Ø P-side is the region of the diode which have plenty of holes or we say plenty of positive charge carrier and n-side is the region of the diode which have plenty of electrons or we say negative charge carrier.

Ø When n-region is connected to the negative terminal and p-side to the positive terminal, the electrons from the negative terminal force the electrons of n-region to move forward and allow the flow of current and this is called forward biasing. While the exact opposite happens in reverse biasing.

Ø Now as mentioned, the diode can act as a conductor as well as a resistor or it can also allow a certain number of electrons to flow. This is the main function of the diode; to control the flow of the electrons, in various electronic device.

3. Question

Write down any four situations in which nanotechnology can be made use of.

Answer

The four situation where we should use nanotechnology to improve the current situation:-

•Situation 1: In a critical operation of human-like cancer or removing tumor nano-drones can be used to do the operation without any actual surgery. Thus, increases the chance of saving human life.

•Situation 2: When a traveler going through any life-threatening situation, a nano-device which helps in the lightning fire as well as self-protection from wild animals can be useful.

•Situation 3: Suppose, you need urgently energy or any source of electricity, and you are in the middle of nowhere for that situation we could build up smaller devices which are easy to carry and helps to provide electricity in times of need.

•Situation 4: When an astronaut is exploring in space he/she can use nanotechnology, it will surely reduce the mass and make exploration easy. For example, the suit he is wearing can be made from nano particles for extreme condition survival.

4. Question

Prepare a short note on the environmental problems caused by e-wastes.

Answer

E-waste is technical all the waste electronic products which have been used and is not fit or updated to use now. So the product turns out to be the E-waste. For example, a person who has bought a laptop in 2000 is 18 years old now. It is working fine but the product is not updated and has low efficiency so, despite being not damaged the laptop is thrown out and is now an E-waste.

There are a number of the environmental problems caused by the E-waste.

•There is no proper disposal system for the E-waste. It goes all along with the normal waste, as there should be a special arrangement to gather all the E-waste because it is very technical to dispose of.

•When E-waste has disposed anywhere or it is directly burned with normal waste it creates a tremendous amount of pollution. Affecting the atmosphere vigorously.

•If the E-waste is disposed of carelessly into the sea it will react with the salts and acid presents in the sea and will create toxins and poisonous product which led to a harmful effect on aquatic life.

•The workers or laborers who handle the E-waste without the complete knowledge of its disposal often burn it to extract the profitable material. This let to serious health issues to the person who do such sort of things.

•The government as well as public is not taking the concept of E-waste seriously this will lead to serious atmospheric problems in the future. So it will be better for everyone to reduce E-waste as well as look into its proper disposal.

Extended Activities

1. Question

Dismantle a defunct radio and try to understand its various parts.

Answer

The following is a picture of dismantled radio the parts which are identifiable are :

•Capacitor -The function of the capacitor in the radio is to set or change the frequency. It is used to tune up the device for a particular frequency.

•Transistor - Sounds are recorded in studios through a microphone and turned into electrical signals. Those signals travel through a circuit, and the transistor amplifies the signal, which is much louder when it reaches a speaker.

•Resistor - The resistor controls the amount of electricity which needs to run the whole set up and as well as any particular part.

•Diode - Diode is the semiconductor device which is used to control the amount of flow of current in any particular direction.

•IC chips - IC chips are the main parts of the radio since they contain all the information on how to work. They are actually a set of rules upon which the device works.

•Amplifiers - Amplifiers are the parts which are used to increase the strength of the signal.

•Speakers and wires - All the connection is done by wires and speaker are used to convert signal into sound.

2. Question

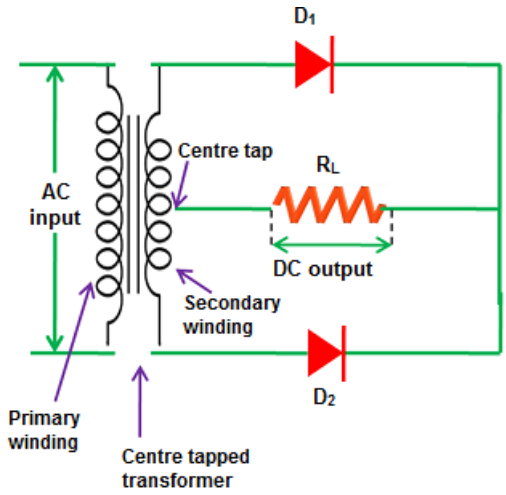
Construct a full wave rectifier that can give 6 V DC and operate it.

Answer

A center tapped full wave rectifier is a rectifier which uses a center tapped transformer and two diodes to convert the complete AC signal into DC signal.

Construction of a center tapped full wave rectifier:

A center tapped full wave rectifier is made up of an AC source, a center tapped transformer, two diodes, and a load resistor.



The upper part of the secondary winding is connected to the diode D1 and the lower part of the secondary winding is connected to the diode D2. Both diode D1 and D2 are connected to a common load RL with the help of a center tap transformer. The center tap is considered as zero voltage reference point.

Operation:

When an alternating current is applied to the transformer it will convert it into full DC signal and we can note down the value of DC current across the load resistance.

3. Question

Collect electronic components and conduct an exhibition.

Answer

The given component is a capacitor. It is a device which store the charge or we can say electrical energy and provide that electrical energy in times of need.

The given components is Diode. It is a semiconductor device which is consisted of two parts formed by suitable doping of two different type of semiconductor material i.e. p-side and n-side.

This is an n-p-n transistor which is consisted of three parts, emitter, base, and collector. The function of this type of transistor is to amplify any small Ac current which is applied to its base part.

This is a p-n-p transistor which is consisted of three parts, emitter, base, and collector. This type of transistor work as a current regulator by allowing only limited and precise amount of current from a source of larger current.

The given component is a resistor. It is a device which stops or resist the flow of current.

4. Question

Present a seminar paper on the topic ‘Growth in the field of telecommunication'.

Answer

"GROWTH IN THE FIELD OF TELECOMMUNICATION"

'Hello' this was the first word which is telecommunicated by Alexander Graham Bell. We have come a very long way from the first word 'hello' to the '5G' internet. The growth is truly unbelievable; in 19's who would have thought about video calling, high speed internet etc. But all these are available now everywhere and anytime.

In ancient times Kings uses archer, horse-riders, pigeon to carry their messages and it would take plenty of time to send and receive messages but now we just have to dial the number and we are able to communicate. The technology not only reduces the efforts to communicate but it also reduces the time for sending and receiving process.

The introduction of various messenger services like Facebook, WhatsApp is so advance that if you show them to anyone from early 19's he/she might even laugh at us. They will be asking is this really possible and surprisingly we will say yes, it is possible and you are the father of all these inventions.

All these happen in less than a century, and the prime reason behind that is a necessity. The necessity to communicate, to share information, to share knowledge. If anything, serious happens at any point in the world we can get information about it at the moment. This all possible with the advancement in telecommunication. Now, telecommunication technology is so developed if anything happens at any point in-universe we can get information about that incident.

But the most important thing is where we are going now? What is the next thing we want to achieve? I believe that the true growth will be at that time when anywhere in the universe if anyone wants to communicate with another person in he/she might be able to do so.

Then I think Alexander Graham Bell will be truly happy.

5. Question

Collect the details of different types of robots and exhibit them on a bulletin board.

Answer

There are mainly 6 types of robots invented and those are listed below in the table with their specialty.

Types of Robot	Specialty
Articulated	This robot design features rotary joints and can range from simple two joint structures to 10 or more joints.
Cartesian	Cartesian robots have three linear joints that use the Cartesian coordinate system (X, Y, and Z).
Cylindrical	The robot has at least one rotary joint which is used for rotational motion along the joint axis.
Polar	In this configuration, the arm is connected to the base with a twisting joint and a combination of two rotary joints and one linear joint.
Scara	The selectively compliant arm for robotic assembly is primarily cylindrical in design.
Delta	Heavily used in the food, pharmaceutical, and electronic industries, this robot configuration is capable of delicate, precise movement.