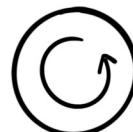


How Things Work

Introduction to -

- Power Consumption
- Categorized AC-DC
- Total Power



Lesson Aims:

1. Summarise Different Categories of Appliances
2. Identify Cost-Saving Appliances.
3. Classify Total Power and Consumption

What is the meaning of energy consumption?

Who gives power to your house?

What do you mean by Energy Saving Devices?



Types of electrical appliances :

Although they all require a nominal voltage that does not exceed 1,000 volts in alternating current and 1,500 in direct current, we can still classify them into different categories, the main and most common of which is size.



Major Appliances

Air conditioners, dishwashers, clothes dryers, drying cabinets, freezers, refrigerators, kitchen stoves, water heaters, washing machines, trash compactors, microwave ovens, and induction cookers are just a few examples of major appliances.

It is commonly referred to as white goods.

Major Appliances

Small Appliances

Small appliances are often compact electrical devices for the home that is also very practical and simple to install.

Juicers, electric mixers, meat grinders, coffee grinders, deep fryers, herb grinders, food processors, electric kettles, waffle irons, coffee makers, blenders, and dough blenders, as well as rice cookers, toasters, exhaust hoods, are yet another category of kitchen appliances.

Small Appliances

Kindly arrange the given appliances into these categories make specific name stickers and put in into different buckets

(Given below is the List of Home Appliances-
Coffee maker, Blender, Mixer, Toaster,
Microwave, Crockpot, Rice cooker, Stove, Lamp,
Light bulb, Lantern, Torch, Clothes iron, Electric
drill, Kettle, Water purifier, Kitchen hood, Electric
guitar, Vacuum cleaner, Electric fan, Evaporative
cooler, Air conditioner, Oven, Dishwasher,
Television, Speaker, Clothes dryer, Washing
machine, Refrigerator)



Energy Consumption Mean

Electrical appliances are an essential part of the modern world. From cell phones to coffee machines, we are either exposed to or use one every moment of our lives. Due to the potential dangers of electricity, appliances must be inspected and tested to ensure the public's safety.



Class I appliances are usually made of metal, have three cables, have a metal Earth pin, and have a fuse in the plug. However, the only way to confirm whether the appliance is Class I is to look for the Class I symbol on the appliance.

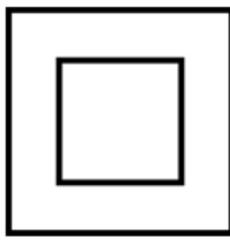
A Class II appliance usually has a plastic cover. The only way to accurately identify it is to look for the Class II appliance symbol. Examples of Class II appliances are hair dryers, DVD players, televisions, computers, and photocopiers.

Class III appliances are identified by the Class III symbol.

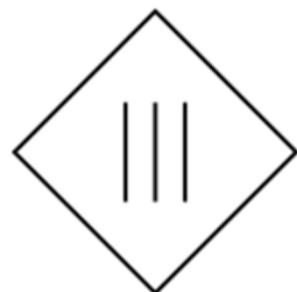
Examples of Class III appliances are laptops, mobile phones, and low-energy light bulbs.



Class I (1)



Class II (2)



Class III (3)

The Power Calculation:

To calculate the power consumption of any appliance, you have to multiply its Wattage (Watt) by the number of hours it is being used (operational hours).



For example, A 1000-watt electric iron running for one hour will consume (1000-watt X 1 hour) 1000-watt hour or 1-kilowatt hour (kWh) of electricity.

Similarly, to calculate the monthly power consumption multiply the daily power consumption by 30 days and for annual power consumption multiply the daily power consumption by 365 days.

Wattage Of the Appliance:

For example, LED TV's wattage ranges from 50 watts to 200 watts. Wattage gives us an indicator of the rate at which the appliance will consume power. From the above example, a 50-watt television will not consume 50 units of electricity, instead, it means the TV will consume electricity at 50 watts per hour.

Operational Hours: Operational hours are the number of hours a device is in operation.

Kilowatt Hours: Kilowatt hours (kWh) is the unit of power. This is the value we want to calculate our electricity provider charges us for every kWh (unit) of electricity our house consumes.

To know your operational hours is pretty easy but what about wattage, let's see how to find the wattage of any appliance.

$$P = \frac{W}{t}$$

P = Power

W = Work done

t = Time taken

Activity

Activity Name - **220V to 12 V Convertor**

Activity

Material requirement –

AC to DC Converter Circuit Required

Components:

Transformer with 1A 13V Rating

4 pcs 1N4007 Diodes

A 1000uF Electrolytic capacitor with the 25V rating.

Few single strand wires

Board

Procedure –

The AC to DC converter is what we'll be talking about now. Consider the 220V AC to 12V DC converter, a commonly used converter in the power supply

Step 1: Decreasing the Voltage Levels

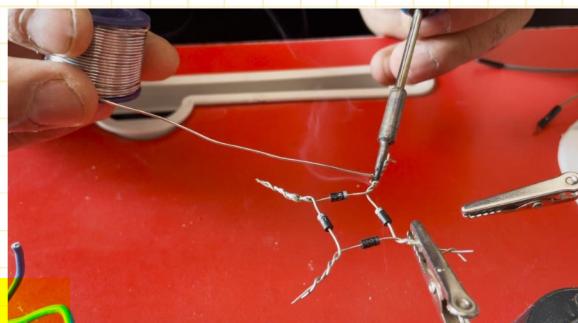
Occasionally, voltages must be increased while transmitting power over great distances. Likewise, voltages must be lowered for equipment that needs less power. Step-up transformers are used to increase the voltage levels, while stepdown transformers are used to decrease the voltage levels.



Step 2: AC to DC Power Converter Circuit

The rectifier converts the AC supply into the DC supply at the load end connection. There are different types of rectifiers, such as half-wave, full-wave, and bridge rectifiers.

Full Bridge rectifier consists of four diodes coupled in a bridge configuration. The diode conducts in only one direction, i.e., when biased forward. In the opposite direction, i.e. during reverse bias, it remains in an off state. During the positive half cycle of the above circuit, diodes D2 and D4 conduct. Diodes D1 and D3 conduct during the negative half cycle of the power supply. In this manner, AC input power is converted to DC output power. However, the DC output power contains pulses and is not pure DC.

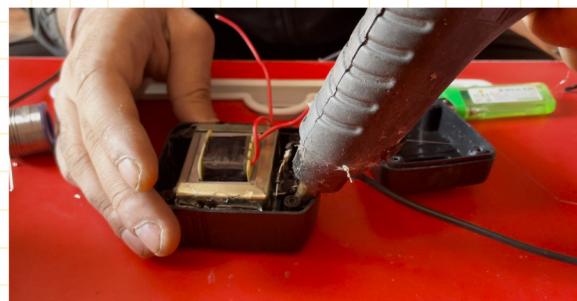


Step 3: Obtaining DC Pure Waveform

The pulsating DC must be converted to pure DC. For this, the majority of the circuits consists of Capacitors. The capacitor is utilised to store energy when the input voltage rises from zero to its maximum value. The capacitor's energy can be discharged when the input voltage falls from its maximum value to zero. Thus, In this way, we can convert the pulsating DC into pure DC using this charging & discharging process of the capacitor



Final product -



Reflection

- 1) How can I calculate my home appliance power consumption?
- 2) What is the formula to calculate the power of an electrical appliance?
- 3) How is electrical power calculated in a house?
- 4) How much power does a home consume?
- 5) How do you calculate power consumption in a house?
- 6) How much power does a house use in 24 hours?
- 7) What consumes the most power in the home?



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