

UNIT 1

Effects of Electric Current

09/07/2020 – Class 8

Activity 1

Answer of Assignments

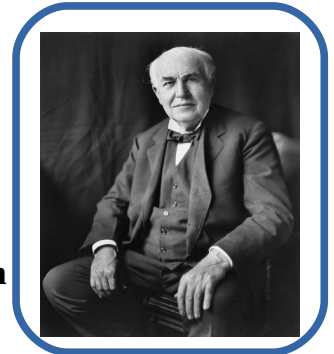
- . If 0.4 A current flows through a bulb which works at 230 V. What is its power?
 $I = 0.4 \text{ A}$, $V = 230 \text{ V}$
 $P = VI = 230 \times 0.4 = 92 \text{ W}$

Lighting Effect of Electric Current

Activity 2

Discussion

- Name the sources used for light in ancient times? **Oil lamps, Lamps using kerosene**
- The invention of electric bulb was a milestone in the human development. Who invented electric bulb? **Thomas Alva Edison**



Activity 2.a

Incandescent lamps (Filament Lamps)

Connect an incandescent lamp to an electric source and turned the switch on.

Observation

Lamp is glowing.

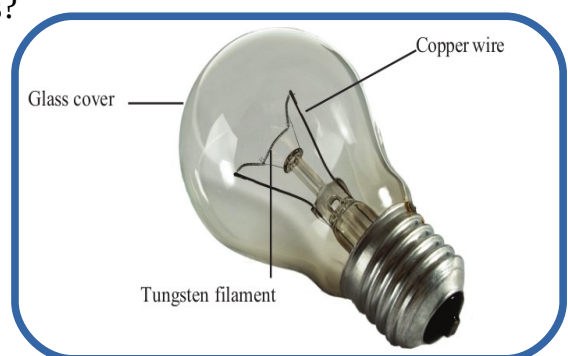


Activity 2.b

Observe an incandescent lamp and finds its parts?

Inference

The main parts of an incandescent lamp are Glass bulb, Holder, Copper wire, Tungsten Filament.



Activity 2.c

Discussion

How an incandescent lamps works?

- When electricity is passed through the filament what happened to it? **Filament becomes white hot**
- Why the filament lamp is called incandescent lamp? **The meaning of incandescent is 'glowing with heat'. In this lamp light is produced by the heating of filament.**

What properties of tungsten make it suitable for being used as a filament?

- Tungsten has high resistivity.
- It has high melting point.
- It can remain in white hot condition for a long time on passing current through it.
- It has high ductility (make as a thin wire).

Activity 2.d

Observe the filament of an incandescent lamp. What is the peculiarity of its construction?

It is made as a coil.

Why the filament of an incandescent lamp is made in the form of a coil?

- When it is made in the form of a coil, we can increase the length of the filament.
- We can made the bulb by increasing or decreasing the length of the filament, and there by change the power of the bulb.

Activity 2.e

- Is anything inside the bulb other than the filament and copper wire? **The bulb is completely evacuated.**
- Why the bulb is evacuated? **The oxygen in the air is reacted with the tungsten filament and it maybe broken down. So to avoid oxidation of the filament the bulb is evacuated.**
- When the filament is in the red hot condition it may be vaporised. To avoid this what to do? **The bulb is filled with inert gas at low pressure.**

Instead of inert gas now a days the bulb is filled with nitrogen. Why?

- **Nitrogen is readily available in nature.**
- **It is cheap.**
- **Small changes in temperature does not influence the expansion of nitrogen.**

- To avoid oxidation of the filament the bulb is evacuated.
- To reduce vaporisation of the filament the bulb is filled with inert gas or nitrogen.

Activity 3

Touch the filament lamp after it has been lit for a short period of time. What do you feel?

Felt heat.

What are the draw back of an incandescent lamp?

- A major part of the electrical energy supplied to an incandescent lamp is lost as heat. Hence the efficiency of these devices is less.
- It cast shadows
- Longevity is less.(1000 hours)

Activity 4.a

Discharge lamps

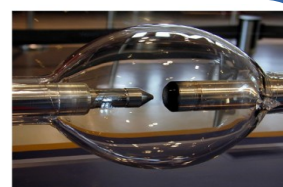
Discussion

What are the different types of discharge lamps?

- Florescent Lamp
- CFL (Compact Florescent Lamp)
- Sodium vapour lamp
- Arc Lamp



Sodium vapour lamp



Arc lamp



Fluorescent lamp



CFL

What are the main parts of discharge lamps?

- Glass tube (It is made with different shapes)
- Two metal electrodes at the ends of the glass tube.
- Some gases are filled inside the tube at low pressure.

Activity 4.b

How a discharge lamp produce light?

Discussion

When high potential difference is applied the gas molecules in the tube get excited. How atoms excited when electricity is passed?

- When high potential is applied the gases in the tube is ionised.
- These ions are moving from one electrode to other.
- During this motion ions may collided with unionised atoms.
- Due to this collision the electrons in the inner shell gets some energy.
- These electrons are jumped to a higher energy shell. At these time the atoms are in an excited state.
- An atom cannot be remain in the excited state for a long time.
- So the electrons returned to their original shell.
- During this process the received energy is emitted as light.

Conclusion

Discharge lamp produce light as a result of discharge of electricity through the gases filled in tubes. When a high potential difference is applied the gas molecules get excited. Excited atoms come back to their original states for attaining stability. During this process the energy stored in them will be radiated as light.

How different coloured lights were produced from discharge lamps?

- **Depending on the difference in the energy levels lights of different colours and other radiations are emitted.**

Activity 4.c

What are the advantages of using discharge lamps instead of incandescent lamps?

An incandescent lamp and a fluorescent lamp is glowing at the same time?

Observation

More white light is produced by the discharge lamp.



Inference

Advantages of discharge lamps over incandescent lamps are,

- Shadow is less.
- More white light is produced.
- Longevity is more. (5000 hours).
- Energy loss less.

Activity 4.d

Drawbacks of a discharge lamp?

- Fluorescent materials inside the tube is harmful to the environment.
- It is made of glass, so give more care while handling it.

Activity 4.e

Scan the QR code find more about discharge lamps.



Activity 6

LED Lamps (Light Emitting Diode)

Glowing two types of LED bulbs.

Observation

One is produced white light and other is produced different coloured lights.

What are the advantages of LED bulb?

- It works with low power.
- Energy crises can be reduced.
- Easy to handle.
- Require small electric power.
- Emits more light with low power.
- It has longer life.
- Not harmful to the environment.



What is the main advantage of electrical energy over other energy forms?

Electrical energy can be converted into many other forms of energy.