

O Level Physics

Tutorial 8: Thermal Processes

Syllabus :

(a) show an understanding that energy is transferred (by heating) from a region of higher temperature to a region of lower temperature until thermal equilibrium is achieved between the two regions

1. State the direction of heat flow when I hold a glass of :

- (i) hot water
- (ii) cold water
- (iii) water at 37 °C.

(b) describe, in microscopic terms, how conduction occurs in solids (via vibration of atoms/molecules and movement of electrons)

2. One end of a rod is hot and the other end is cold. Describe, in microscopic terms, how heat flows through the rod in each of the following cases :

- (i) a metal rod,
- (ii) a plastic rod.

(c) describe, in terms of density changes, how convection occurs in fluids

3. A pot of cold water is placed on a heater. Describe, in terms of density changes, how convection occurs.

(d) explain that energy transfer by electromagnetic radiation does not require a material medium and that this rate of energy transfer to/from a body is affected by its: (i) surface colour and texture (ii) surface temperature (iii) surface area

4. (i) How is it possible for heat from the sun to get to Earth if there is nothing in between to conduct heat?

(ii) Which part of the electromagnetic radiation carries the energy that would heat things up?

(iii) A black cup and a white cup are placed in the sun. Which one would warm up faster?

(iv) A smooth white cup and a rough white cup are placed in the sun. Which one would warm up faster?

(v) A black cup and a white cup both contains hot water. They are placed on a table in a room. Which one would cool down faster?

(e) apply the concepts of conduction, convection and radiation in everyday examples.
