5.3 - Thermal Convection

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- (2000) Write down a formula for the rate of cooling under natural convection and define all the symbols used.
- (2007) State Newtons law of cooling and give one limitation of the law.
- (2007) A body initially at 70°C cools to a temperature of 55°C in 5 minutes. What will be its temperature after 10 minutes given that the surrounding temperature is 31°C ? (Assume Newtons law of cooling holds true)
- (2010) Define thermal convection.
- (2010) State Newtons law of cooling.
- (2010) A glass disc of radius 5 cm and uniform thickness of 2 mm had one of its sides maintained at 100°C while copper block in good thermal contact with this side was found to be 70°C . The copper block weighs 0.75 kg. The cooling of copper was studied over a range of temperature and the rate of cooling at 70°C was found to be 16.5 K/min. Determine the thermal conductivity of glass.
- (2013) A person sitting on a bench on a calm hot summer day is aware of a cool breeze blowing from the sea. Briefly explain why there is a natural convection?
- (2013) A cup of tea kept in a room with temperature of 22°C cools from 66°C to 63°C in 1 minute. How long will the same cup of tea take to cool from the temperature of 43°C to 40°C under the same condition?
- (2014) Define thermal convection.
- (2014) Prove that at a very small temperature difference, $\Delta T = T_b \;\; T_s$, Newton's law of cooling obeys the Stefans law, whereby T_b , is the temperature of the body and T_s is the temperature of the surrounding.
- (2016) Briefly explain why forced convection is necessary for excess temperate less than 20 K?
- (2016) State Newtons law of cooling.
- (2016) A body cools from 70°C to 40°C in 5 minutes. If the temperature of the surroundings is 10°C , Calculate the time it takes to cool from 50°C to 20°C.