PQ 8 Heat

Q

Q1

A body of mass 0.150 kg has its temperature increased by 5 degrees K when 385J of thermal energy is provided to it. What is the body's specific heat capacity?

Q2

- A radiator made out of iron has a mass of 45 kg and is filled with 23 kg of water.
- A) What is the heat capacity of the water filled radiator?
- B) If thermal energy is provided to the radiator at the rate of 450W, how long will it take for the temperature to increase by 20 degree C?

Q3

- A car (1360 kg) descends from a hill of 86m at a constant speed of 20 kmph. Assuming that all the potential energy of the car goes into heating the brakes, find the rise in temperature of the brakes. Take the heat capacity of the brakes to be 16 kj degree K (ignore any other heat losses)

Q4

How much ice at −10 °C must be dropped into a cup containing 300 g of water at 20 °C in order for the temperature of the water to be reduced to 10 °C? The cup itself has a mass of 150 g and is made out of aluminium. Assume that no thermal energy is lost to the surroundings.

Q5

The surface of a pond of area 20 m^2 is covered by ice of uniform thickness 6 cm. The temperature of the ice is -5 °C. How much thermal energy is required to melt this amount of ice into water at 0 °C? (Take the density of ice to be 900 kg m^{-3}.)

Q6

(a) How much thermal energy is required to warm 1.0 kg ice initially at −10 °C to ice at 0 °C?

(b) How much thermal energy is required to melt the ice at 0 °C.

(c) How much thermal energy is required to further increase the temperature of the water from 0 °C to 10 °C.

Q7

- Ice at 0 degrees C is added to 1 litre of water at 20 degree C cooling it down to 10 degrees C. How much ice was added?