PQ 3 Heat

Questions

Q

PQ1

- A 0.500 kg aluminum pan on a stove is used to heat 0.250 litres of water from 20.0ºC to 80.0ºC . (a) How much heat is required? What percentage of the heat is used to raise the temperature of (b) the pan and (c) the water?

PQ2

Lorry brakes used to control speed on a downhill run do work, converting gravitational potential energy into increased internal energy (higher temperature) of the brake material. This conversion prevents the gravitational potential energy from being converted into kinetic energy of the truck. The problem is that the mass of the lorry is large compared with that of the brake material absorbing the energy, and the temperature increase may occur too fast for sufficient heat to transfer from the brakes to the environment.

Calculate the temperature increase of 100 kg of brake material with an average specific heat of 800 J/kg · ºC if the material retains 10% of the energy from a 10,000-kg truck descending 75.0 m (in vertical displacement) at a constant speed.

PQ3

- How much heat energy is given out when 3 kg of water at 40 ^{o}C cool to 25 ^{o}C?

PQ4

- If 25 kJ is necessary to raise the temperature of a block from 25ºC to 30ºC , how much heat is necessary to heat the block from 45ºC to 50ºC ?

PQ5

- Three ice cubes are used to chill a soda at 20ºC with mass *m*soda = 0.25 kg . The ice is at 0ºC and each ice cube has a mass of 6.0 g.
- Assume that the soda is kept in a foam container so that heat loss can be ignored. Assume the soda has the same heat capacity as water. Find the final temperature when all ice has melted.

PQ6

- Why does snow remain on mountain slopes even when daytime temperatures are higher than the freezing temperature?