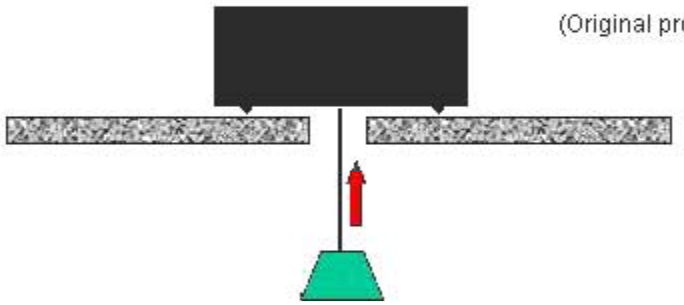
Chapter 4 Question #1

A black box is sitting over a hole in a table. It is isolated in every way from its surroundings with the exception of a very thin thread which is connected to a weight.

You observe the weight slowly moving upwards towards the box.

(Original problem due toLevenspie| 1996)



1) This situation violates the First Law of Thermodynamics

2) Heat must be transferred down the thread

3) The First Law is satisfied, the energy in the box is increasing

4) The First Law is satisfied, the energy in the box is decreasing

5) The First Law is satisfied, the energy in the box is constant

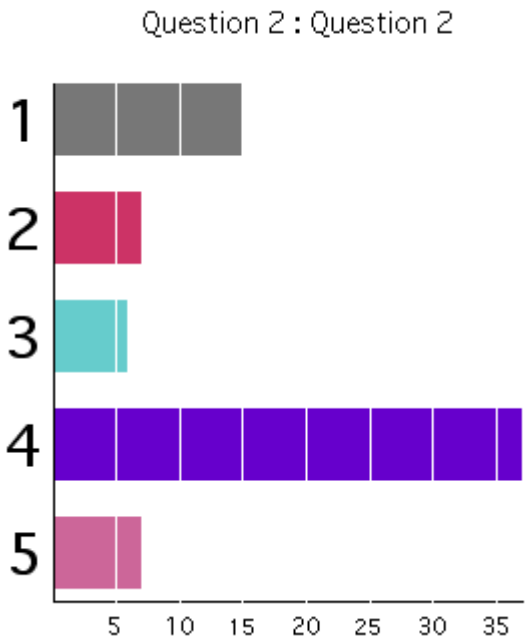
LO#1

Chapter 4 Question 1 Answer:

(3) The First Law is satisfied, the energy in the box is decreasing

If we draw a dashed line around the box and the weight, the total energy must be constant. Now if we draw a dashed line around the box only, what do we know? Well we can see the weight moving up (gaining potential energy). Therefore the energy of the box must be dropping at the same rate.

Class Response (2003):



Class Response (2002):