التجربة الثانية

اسم التجربة:- الحرارة النوعية لجسم صلب

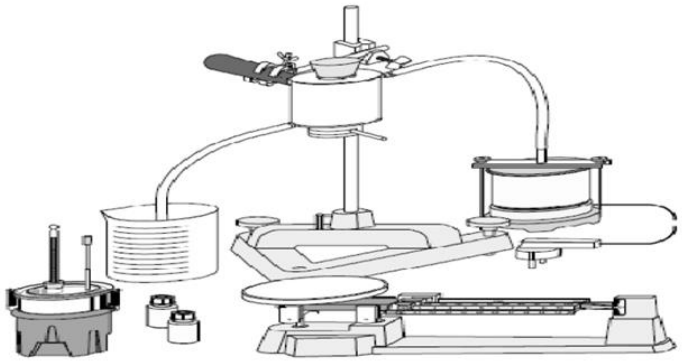
Specific heat of a solid body

The purpose of the experiment:-

Finding the specific heat of a solid body (metal)

Used equipment's :-

Calorimeter, thermometer, beaker, graduated tester, stop watch, heater, scales. Solid materials whose specific temperature is to be determined.



Theory :-

Substances differ from each other in the amount of heat they gain from the external medium when subjected to exactly the same experimental conditions. That is, the nature of the material is related to the amount of heat acquired, as well as its high temperature, and thus each material has its own specific heat that distinguishes it from other materials.

Specific heat is defined as the amount of heat required to change the temperature of a unit mass of a body by one temperature and its unit of measure: **Call/gm .^{o}C or J/Kg. ^{o}C**

The amount of heat (q) gained or lost by a body of mass (w) and specific heat (C) is

$$q = C * w * \Delta t$$

The amount of heat lost by a hot body is (q_{lost}). And the amount of heat absorbed by the water is (q_{gain}), which is equal to the amount of heat lost by the body

Work steps :-

1- Clean and dry the calorimeter, then determine its weight while it is empty and let it be (W_c).
2- Put cool distilled water in the calorimeter. This volume should be determined using a graduated cylinder, then the calorimeter and the water it contains should be weighed. Let it be (W_1).
3- Finding the mass of water W_{water} from equation (1)
4- Measure the cold water temperature(t_o).
5- Measure the mass of the solid body whose specific heat is to be known (W_m).
6- Putting the solid body in a beaker containing water, then starting to heat it until it boils, then measuring the boiling temperature, which represents the initial temperature of the metal (t_i).
7- Transfer the solid body to a calorimeter containing cold water and measure the final temperature (t_f).
8- Apply the following formula to find the specific heat of a body:

$$C = \frac{q}{W_m * \Delta t}$$

Table of accounts

metal type	W_m	W_c	W_1	W_{water}	t_o	t_i	t_f	Δt_1	Δt_2

$$W_{water} = W_1 - W_c \quad \dots\dots\dots\dots (1)$$ **water weight**

$$q = C * w * \Delta t_1 \quad \dots\dots\dots\dots (2)$$ **Thermal energy**

$$q_{water} = C * w_{water}(\Delta t_1) = q_{gain} \quad // \quad \dots\dots (\Delta t_1 = t_f - t_o)$$

$$q_{lost} = -q_{gain} \quad \dots\dots\dots\dots (3)$$

$$C = \frac{q_{lost}}{W_m * \Delta t_2} \quad \dots\dots\dots\dots (4)$$ **Specific heat**

$$C = \frac{q_{lose}}{w_m * (\Delta t_2)} \quad // \quad \dots\dots (\Delta t_2 = t_f - t_i)$$