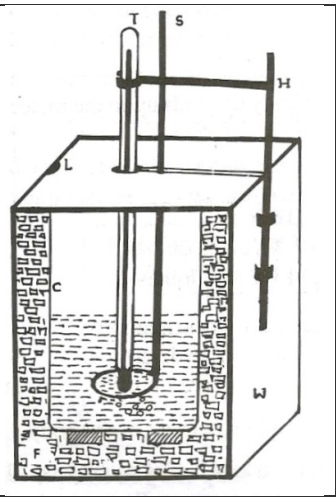
CLASS-10

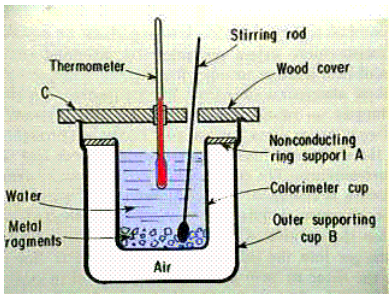
PHYSICAL SCIENCE

PERIOD PLANS

CHAPTER: 01 – HEAT

PERIOD PLAN-06 : Determination of specific heat of a solid

<table>
<tr><th>Content Analysis</th><th>Class Room Environment</th><th>Teaching Learning Material</th></tr>
<tr><td><u>Determination of specific heat of a solid :</u></td><td>Experiment : Doing experiment to determine the specific heat of a solid (lead shots) using calorimeter.</td><td rowspan="2">Calorimeter, thermometer , water, hot water, solid shots (lead shots)</td></tr>
<tr><td><u>Working procedure :</u> First we have to find the mass of the calorimeter (m_1). Fill nearly half of the calorimeter with water and find the mass of calorimeter with water (m_2). Measure the initial temperature with laboratory thermometer ($T_1{}^oC$). This is the temperature of both water and also calorimeter.
Take a few lead shots and place them in hot water. Heat them up to a temperature 100^{o}C. So measure the temperature of lead shots ($T_2{}^oC$). Transfer the lead shots into calorimeter quickly with minimum loss of heat. Stir the mixture well. Note the final temperature ($T_3{}^oC$). Measure the final mass of calorimeter along with water and lead shots (m_3).
Heat (Q) = m.s.ΔT
According to the method of mixtures :
Heat lost by the solid = Heat gained by calorimeter + Heat gained by water
$(m_3-m_2).S_l.(T_2-T_3) = m_1.S_c.(T_3-T_1) + (m_2-m_1).S_w.(T_3-T_1)$
$S_l = \frac{[m_1 S_c+(m_2-m_1)S_w][T_3-T_1]}{(m_3-m_2)(T_2-T_3)}$</td><td>Observation :
m_1 = …… gm
m_2 = …… gm
$m_2 – m_1$ = …… gm
T_1 = …… ^{o}C
T_2 = …… ^{o}C
m_3 = …… gm
$m_3 – m_2$ = …… gm
T_3 = …… ^{o}C
$T_3 – T_2$ = …… ^{o}C
S_w = 1 cal/gm-^{o}C
S_c = 0.095 cal/gm-^{o}C
S_l = ?
Calculation :
$S_l = \frac{[m_1 S_c+(m_2-m_1)S_w][T_3-T_1]}{(m_3-m_2)(T_2-T_3)}$
$S_l = \frac{[m_1 (0.095)+(m_2-m_1)1][T_3-T_1]}{(m_3-m_2)(T_2-T_3)}$
= ……
= ……
= ……
= ……</td></tr>
<tr><td><u>Low cost / No cost man made calorimeter :</u>
  </td><td colspan="2"> 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