LA IMMACULADA CONCEPCION SCHOOL
SENIOR HIGH SCHOOL
GRADE 11 – STEM: GENERAL CHEMISTRY

MARCH 30 – APRIL 3, 2020
TOPIC: CALORIMETRY PROBLEM SOLVING

Sample problems:

Things you need:

- ✓ Calculator
- ✓ Table of Specific heat of substances
- ✓ TUMBLER with water! Keep hydrated everyone!

Formula :

q= m(mass)x c(specific heat)x Δt (change if temperature T_f-T_i)
q= mcΔt

where:

q =is expressed in J
m =is expressed in g
c =is expressed in J/g°C
t =is expressed in °C

1. How much energy is required to heat 50g of water from 20°C to 80°C. the specific heat of water is 4.184 J/g°C

Given :

m= 50g

c = 4.184J/g°C

Δt = 80°C - 20°C = 60°C

Solution:

q = mcΔt

q= 50 ~~g~~ (4.184 J/~~g~~°~~C~~)(60°~~C~~)

q= **12,552J** converting it to kJ = 12,552~~J~~ x 1kJ/1000~~J~~ = **12.552 kJ or 12.55kJ**

2. A 445 g sample of ice at –58°C is heated until its temperature reaches –29°C. Find the change in heat content of the system.

Solution:

q = mcΔt

q= (445g) (2.11 J/ g°C)(29°C)

q= 27,229.55 j ≈ 27.22 kJ

Copy and answer the following in a 1 whole sheet of paper. Write the given and complete solution.

1. How much heat is needed to raise the temperature of 500g of water from 20.0°C 100°C
2. If 145 J of heat is added to 25 grams of iron at a temperature of 15°C, what will be the final temperature?
3. A 80 g sample of water at 21°C is heated until it becomes steam with a temperature of 143°C. Find the change in heat content of the system.
4. 240 g of water (initially at 20°C) are mixed with an unknown mass of iron (initially at 500°C). When thermal equilibrium is reached, the system has a temperature of 42°C. Find the mass of the iron.
5. A 322 g sample of lead (specific heat = 0.138 J/g°C) is placed into 264 g of water at 25°C. If the system's final temperature is 46°C, what was the initial temperature of the lead?

LA IMMACULADA CONCEPCION SCHOOL
SENIOR HIGH SCHOOL
GRADE 12 – STEM: GENERAL PHYSICS 2

MARCH 30 to APRIL 3, 2020

TOPIC: LAW OF REFRACTION OF LIGHT

Light travels in a straight line in one medium. But light bends when it travels from one medium to another, this is called the refraction of light.

- Refraction is due to change in the speed of light as it enters from one transparent medium to another.
- Experiments show that refraction of light occurs according to certain laws.

✓ The incident ray, the refracted ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane.

✓ The ratio of the sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given color and for the given pair of media. The law is also know as Snell's Law of refraction.

✓ If *i* is the angle of incidence and *r* is the angle of refraction then $\frac{\sin i}{\sin r}$ = constant = *n.* This constant value is called the refractive index of the second medium with respect to the first medium.

The Refractive Index

- We now know about refraction of light and the extent of the change in direction that takes place in a given pair of media is expressed in terms of the *refractive index,* the 'constant'.
- The refractive index is related to an important physical quantity that is relative speed of propagation of light in different media as light propagates with different speeds in different media.

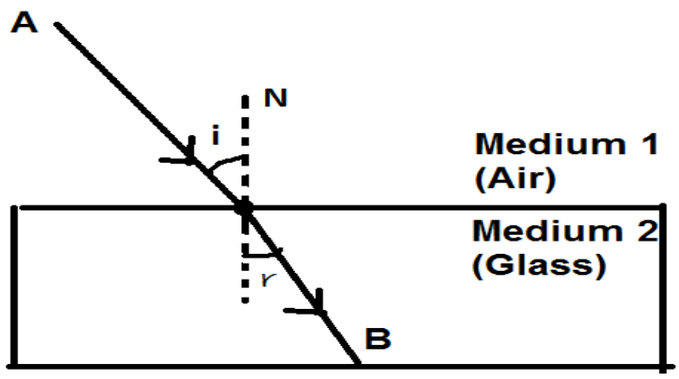

Figure 1

- Let V_1 be the speed of light in medium 1 and v_2 be the speed of light in medium 2 then the refractive index of medium 2 with respect to medium 1 is given the ratio of the speed of light in medium 1 and the speed of light in medium 2.So,

$n_{21} = \frac{v_1}{v_2}$ where; v_1 = speed of light in medium 1, v_2 = speed of light in medium 2 , n_{21} is the refractive index of medium 2 with respect to medium 1.

- The refractive index of medium 1 with respect to medium 2 is represented as n_{12}. It is given by

$n_{12} = \frac{v_2}{v_1}$ where; v_2 = speed of light in medium 2, v_1 = speed of light in medium 1, n_{12} is the refractive index of medium 1 with respect to medium 2.

- If medium 1 is vacuum or air, hen the refractive index of medium 2 is considered with respect to vacuum. This is called the *absolute refractive index* of he medium.

- If c is the speed of light in the air and v is the speed of light in any medium then refractive index n_m of the medium would be

$n_m = \frac{c}{v}$ where; c = speed of light in air, v = speed of light in medium

Activity/Experiment

Materials:

Pencil

Transparent Glass

1/2 glass of water

Procedure:

1. Put the pencil on the transparent glass

2. Put 1/2 glass of water into transparent glass

3. On a 1/2 yellow paper, explain and discuss what happened on the image formed by the experiment.