**St. Catherine High**

**Department of Science**

**Physics Calculation**

**Module 2**

As we continue with our understanding of the material let us look at some conditions for analysis.

***Question 1***

Imagine a shiny kettle on a gas stove to be heated with water to be boiled.

1. By what process is heat transferred to water in kettle
2. Explain why the kettle is shiny on the outside?
3. How does cover prevent heat loss?

If mass of water is 1.5 kg and the temperature changes from $30^{0}C$ to $100^{0}C$

1. Calculate thermal energy required to raise its temperature.
2. How much more energy must be absorbed for 0.2 kg of water to boil off?
3. Explain why it is better not to fill the kettle with water when making a cup or two of tea

***Specific heat capacity 0f water 4200J/Kg K***

***Specific latent heat of vaporization of water*** $ 2.3 x 10^{6} J/kg$

***Question 2***

1. Define the term specific heat capacity
2. Write an equation that relates specific heat capacity to heat capacity

A busy housewife left 25 g of ice in an open container while answering her telephone. Upon return, the ice at $0^{0}$C converted to water at $3.0^{0}$C

1. Calculate energy needed for ice to steam at totally melt and to reach its present temperature. Assume no heat losses
2. Heating and melting activity took place over 300 s, calculate rate at which ice/water was receiving heat

***Specific heat capacity of water 4200 J/Kg K***

***Specific latent heat of fusion of ice 340 000 J/Kg***

***Question 3***

1. State equation for General Gas law

A child blows up a balloon for her birthday party

1. Explainin terms of kinetic theory, how pressure is exerted by air in balloon

A block of ice mass 2000 g was heated from $0^{0}$C to steam at $100^{0}$C

1. Calculate energy used in Joules
2. Activity above took 6000s, how much power is used

***Question 4***

A physicist converts 8 kg of water at $30^{0}$C to steam at $100^{0}$C, assuming no heat loss, calculate

1. Energy to heat water to $100^{0}$C
2. Energy to convert water to steam at $100^{0}$C
3. What is the total energy in mega joules, required to heat 8Kg of water at $33^{0}$C to steam at $100^{0}$C

***Specific heat capacity of water 4200 J/Kg K***

***Specific latent heat of vaporization of water 2 300 000 J/Kg***

***Question 5***

A car tire is pumped to a pressure of $2.3 x 10^{3 }Nm^{-2}$ in the morning when temperature is $23^{0}C.$

Later in the day temperature rises to $34^{0}C.$

1. Calculate new pressure in tire with volume is kept constant
2. Using kinetic theory of matter, explain why increase in pressure occurred

Calculate the ratio of new volume to old volume $\frac{V\_{2}}{V\_{1}}$ for tire, if pressure is constant while temperature rises from$ 23^{0}C.$ to $34^{0}C.$

Please do your best to understand what you are doing in solution to problems

Any questions contact nattyphoto@gmail.com Mr. Reid