UNIVERSITY CEU SAN PABLO
SCHOOL OF PHARMACY
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

ISSUES OF PHYSICAL CHEMISTRY

2018-2019

LESSON 1

1. Classify each magnitude as extensive or intensive:

a) Temperature

b) Mass

c) Refractive index

d**)** Molar volume

2. Justify whether the following statements are true or false:

a) ΔH is a state function.
b) C_V of an ideal gas is independent of temperature.
c) Q = 0 in a cyclic process.
d) In a closed system with only PV work, a process at constant pressure with q> 0 must imply $\Delta T > 0$.

3. Justify, using the appropriate equations, whether the following statements are true or false:

a) The magnitudes H, U, PV, Q, W, ΔH and $P\Delta V$ have all the same dimensions.
b) ΔH is only defined for a process at constant pressure.
c) In a process at constant volume for a closed system: $\Delta H = \Delta U$.
d) Heat of an irreversible change from state 1 to state 2 may be different from heat of the same state change performed reversibly.

4. Determine if the following quantities: q, w, V, ΔH, ΔU, ΔS, are higher, lower or equal to zero for the following processes:

a) Reversible ice melting at 0ºC and 1 atm.
b) Reversible isobaric cooling of an ideal gas
c) Reversible and isochoric heating of a solid.

Justify your answer using the appropriate equations.

5. Justify, using the appropriate equations, whether the following statements are true or false:

a) Work can always be calculated through the following expression:

$$W = -nRT \log \frac{V_2}{V_1}$$

b) The following equation enables the calculation of the variation of the system internal energy in any process:

$$dU = Cv\ dT$$

c) When an ideal gas undergoes a transformation in which the thermodynamic variables: pressure, volume and temperature are not constant, the variation of enthalpy of the process must be calculated through the following expression:

$$\Delta H = R\ \Delta T$$

d) The following equation can be applied in any system and for any process:

$$\Delta S = \frac{\Delta H}{T}$$