ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

FOR GOD AND COUNTRY

WORKSHEET-45(CLASS-11)

TOPIC- THERMODYNAMICS

SUBTOPIC-PART-1

SUBJECT – CHEMISTRY
DURATION – 30 mins

F.M. - 15
DATE – 06.11.20

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1. Standard enthalpy of vapourisation $D_{vap}H^{Q}$ for water at 100° C is 40.66 kJmol^{-1}. The internal energy of vapourisation of water at 100°C (in kJmol^{-1}) is

(Assume water vapour to behave like an ideal gas)

a) +43.76 b) +40.66 c) +37.56 d) -43.76

2. The enthalpy of fusion of water is 1.435 kcal/mol. The molar entropy change for the melting of ice at 0°C is-

a) 5.260 cal/(mol K) b) 0.526 cal/(mol K) c) 0.526 cal/(mol K) d) 21.04 cal/(mol K)

3. Consider the reaction :

$4NO_{2(g)} + O_{2(g)} \rightarrow 2N_2O_{5(g)}$, $\Delta_rH = -111$kJ.

If $N_2O_{5(s)}$ is formed instead of $N_2O_{5(g)}$ in the above reaction, the Δ_rH value will be:

(given, ΔH of sublimation for N_2O_5 is 54 kJ mol^{-1})

a) –219 kJ b) –165 kJ c) +54 kJ d) +219 kJ

4. Based on the first law of thermodynamics, which one of the following is correct?

a) For an isothermal process, q = +w b) For an isochoric process, ΔU = -q
c) For an adiabatic process, ΔU = -w d) For a cyclic process, q = -w

5. The amount of the heat released when 20 ml 0.5 M NaOH is mixed with 100 ml 0.1 M HCl is x kJ. The heat of neutralization is-

a) – 100 x kJ/molb) – 50 x kJ/molc) + 100 x kJ/mold) +50 x kJ/mol

6. The bond energy (in kcal mol^{-1}) of a C—C single bond is approximately-

a) 1 b) 10c) 100 d) 1000

7. **The species which by definition has ZERO standard molar enthalpy of formation at 298 K is-**

a) $Br_2(g)$ b) $Cl_2(g)$ c) $H_2O(g)$ d) $CH_4(g)$

8. **The standard enthalpy of formation of NH_3 is –46.0 kJ mol^{-1}. If the enthalpy of formation of H_2 from its atoms is –436 kJ mol^{-1} and that of N_2 is –712 kJ mol^{-1}, the average bond enthalpy of N — H bond is NH_3 is-**

a) –1102 kJ mol^{-1} b) –964 kJ mol^{-1} c) +352 kJ mol^{-1} d) +1056 kJ mol^{-1}

9. **The amount of heat evolved when 500 cm^3 of 0.1 M HCl is mixed with 200 cm^3 of 0.2 M NaOH is _____.**

a) 1.292 kJ b) 2.292 kJ^{-1} c) 3.392 kJ d) 0.292 kJ

10. **In a constant volume calorimeter, 3.5 g of a gas with molecular weight 28 was burnt in excess oxygen at 298.0 K. The temperature of the calorimeter was found to increase from 298.0 K to 298.45 K due to the combustion process. Given that the heat capacity of the calorimeter is 2.5 kJ K^{-1}, the numerical value for the enthalpy of combustion of the gas in kJ mol^{-1} is-**

a) 3 b) 7 c) 8 d) 9

11. **If one mole of ammonia and one mole of hydrogen chloride are mixed in a closed container to form ammonium chloride gas, then-**

a) $\Delta H > \Delta u$ b) $\Delta H = \Delta u$ c) $\Delta H < \Delta u$ d) there is no relationship

12. **Which of the following is an intensive property?**

a) Temperature b) surface tension c) viscosity d) all of these

13. **An ideal gas is allowed to expand both reversibly and irreversibly in an isolated system. If Ti is the initial temperature and Tf is the final temperature, which of the following statements is correct?**

a) $(T_f)_{irrev} > (T_f)_{rev}$ b) $T_f > T_i$ for reversible process but $T_f = T_i$ for irreversible process c) $(T_f)_{rev} = (T_f)_{irrev}$
d) $T_f = T_i$ for both reversible and irreversible processes

14. **The standard enthalpy of formation ($\Delta_f H°$) at 298 K for methane, $CH_4(g)$, is –74.8 kJ mol^{-1}. The additional information required to determine the average energy for C – H bond formation would be-**

a) the dissociation energy of H_2 and enthalpy of sublimation of carbon b) latent heat of vaporization of methane c) the first four ionization energies of carbon and electron gain enthalpy of hydrogend) the dissociation energy of hydrogen molecule, H_2

15. **The temperature of the system .decreases in an-**

a) Adiabatic compression b) Isothermal expansion c) Isothermal compression d) Adiabatic expansion

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