Name: Section number: ID number:

Constants:

R= = 0.0821 litre.atm .

1. **Choose the correct answer of the following**
2. The Born-Haber cycle of formation NaCl required the following enthalpies except:
   1. Enthalpy of ionization
   2. Enthalpy of naturalization
   3. Enthalpy of Electron affinity
   4. Enthalpy of sublimation
3. In this reaction: S(Rhombic) 🡪 S(Monoclinic), ΔH is called:
   1. enthalpy of atomization
   2. enthalpy of allotropic
   3. enthalpy of sublimation
   4. enthalpy of naturalization
4. The value of ΔH in this reaction H2O (l) H2O (g) is:
   1. always negative
   2. always positive
   3. sometimes positive, sometimes negative
   4. always zero
5. The energy released when a bond is formed or absorbed when it is broken is called:
   1. Bond dissociation energy.
   2. Bond energy.
   3. Bond enthalpy.
   4. None of above are mentioned
6. The heat energy released when one mole of solid in its standard state is formed from its ions in the gaseous state is called
   1. Lattice enthalpy.
   2. Bond energies
   3. Both (a) and (b)
   4. None of the above
7. C (graphite) + O2 (g) 🡪 CO2 (g), ΔH = -394 kJ so the ΔHfo of CO2 is:
8. + 394 kJ/mole
9. -197 kJ/mole
10. -794 kJ/mole
11. -394 kJ/mole
12. In the reaction, H2 (*g*) + F2 (*g*) →  2HF (*g*),

the enthalpy change of the above reaction using bond energies is:

(The bond energies as the flowing table)

|  |  |  |  |
| --- | --- | --- | --- |
| Type of bond | H-H | F-F | H-F |
| Bond energy kJ/mol | 436.4 | 156.9 | 568.2 |

1. -25.1 kJ
2. -543.1 kJ
3. 25.1 kJ
4. 543.1 kJ
5. In a Carnot cycle, the working fluid is
   1. a real gas
   2. an ideal gas
   3. a natural gas
   4. none of the mentioned
6. A Carnot heat engine operates between reservoirs at temperatures of 700 K and 300 K. In one cycle it absorbs 1500 J heat. The work done by the engine is
   1. 857 J
   2. 1500 J
   3. 800 J
   4. 600 J
7. **Which oh the following statement is true and which one is false?**

10**.**

1. ΔHfᴼ of O2 (g) = 0 (TRUE)
2. In Hess law, when reactants are converted to products, the change in enthalpyis the same whether the reaction takes place in one step or in a series of steps. ( TRUE)
3. Born-Haber cycle is the unique way to find ΔH magnitude .( false )
4. In Carnot engine, source of heat (TH) > heat Sink (TC). ( TRUE)
5. for all Carnot engines, the Carnot efficiency depends on the working substance, TH and TC. (false )
6. For this reaction at 298 K:

Sb4O6(s) + 6C(s) → 4Sb(s) + 6CO2(g) ΔH = 778 kJ,

The ΔSsurr= +2.6 kJ/K. ( false )

1. **Answer the following problems:**

11. In Carnot cycle, the gas expands in the first step at 120°C to 3V . In the 2nd step the gas expands to 6V .Then continue the cycle normally .Calculate the work done in the first and second steps(ɤ =1.2).

Good luck