

CLASS : XI<sup>th</sup>  
DATE :

SUBJECT : CHEMISTRY  
DPP No. : 5

## Topic :- THERMODYNAMICS

- When a solid melts, there is:
  - An increase in enthalpy
  - No change in enthalpy
  - A decrease in enthalpy
  - A decrease in internal energy
- Maximum entropy will be in which of the following?
  - Ice
  - Liquid water
  - Snow
  - Water vapour
- When enthalpy and entropy change for a chemical reaction are  $-2.5 \times 10^3$  cal and  $7.4$  cal  $\text{deg}^{-1}$  respectively predict the reaction at  $298$  K is
  - Spontaneous
  - Reversible
  - Irreversible
  - Non-spontaneous
- A closed flask contains water in all its three states, solids, liquid and vapour at  $0^\circ\text{C}$ . In this situation the average KE of the water molecule will be:
  - Maximum in vapour state
  - Maximum in solid state
  - Greater in the liquid than in vapour state
  - Same in all the three states
- If  $\text{C}(s) + \text{O}_2(g) \rightarrow \text{CO}_2(g); \Delta H = r$   
and  $\text{CO}(g) + \frac{1}{2}\text{O}_2 \rightarrow \text{CO}_2(g); \Delta H = s$  then, the heat of formation of CO is
  - $r+s$
  - $r-s$
  - $s-r$
  - $rs$
- The value of  $\Delta H^\circ$  for the reaction  $\text{Cu}^+(g) + \text{I}^-(g) \rightarrow \text{CuI}(g)$  is  $-446$   $\text{kJ mol}^{-1}$ . If the ionisation energy of Cu(g) is  $745$   $\text{kJ mol}^{-1}$ , and the electron affinity of (I)g is  $-295$   $\text{kJ mol}^{-1}$ , then the value of  $\Delta H^\circ$  for the formation of one mole of CuI(g) from Cu(g) and I(g) is :
  - $-446$   $\text{kJ mol}^{-1}$
  - $450$   $\text{kJ mol}^{-1}$
  - $594$   $\text{kJ mol}^{-1}$
  - $4$   $\text{kJ mol}^{-1}$
- The entropy of the universe:
  - Increasing and tending towards maximum value
  - Decreasing and tending to be zero
  - Remains constant
  - Decreasing and increasing with a periodic rate

8. The internal energy of a substance
- Increases with increase in temperature
  - Decreases with increases in temperature
  - Can be calculated by the relation  $E = mc^2$
  - Remains unaffected with change in temperature
9.  $\Delta H_f$  of graphite is 0.23 kJ/mol and  $\Delta H_f$  of diamond is 1.896 kJ/mole.  $\Delta H_{\text{transition}}$  from graphite to diamond is :
- 1.66 kJ/mole
  - 2.1 kJ/mole
  - 2.33 kJ/mole
  - 1.5 kJ/mole
10. When two moles of hydrogen expands isothermally against a constant pressure of 1 atm, at 25°C from 15 L to 50 L, the work done (in litre atm) will be
- 17.5
  - 35
  - 51.5
  - 70
11. Which value of heat of formation indicates that the product is the least stable?
- 94 kcal
  - 231.6 cal
  - + 21.4 kcal
  - + 64.8 kcal
12. The heat of combustion for C, H<sub>2</sub> and CH<sub>4</sub> are - 349.0, - 241.8 and - 906.7 kJ respectively. The heat of formation of CH<sub>4</sub> is :
- 174.1 kJ
  - 274.1 kJ
  - 374.1 kJ
  - 74.1 kJ
13. Given,
- $S + O_2 \rightarrow SO_2, \Delta H = - 298.2 \text{ kJ}$
  - $SO_2 + \frac{1}{2}O_2 \rightarrow SO_3, \Delta H = - 98.7 \text{ kJ}$
  - $SO_3 + H_2O \rightarrow H_2SO_4, \Delta H = - 130.2 \text{ kJ}$
  - $H_2 + \frac{1}{2}O_2 \rightarrow H_2O, \Delta H = - 287.3 \text{ kJ}$
- Then the enthalpy of formation of H<sub>2</sub>SO<sub>4</sub> at 298 K will be
- 814.4 kJ
  - +320.5 kJ
  - 650.3 kJ
  - 933.7 kJ
14. Based on the first law of thermodynamics, which one of the following is correct?
- For an isochoric process  $= \Delta E = - Q$
  - For an adiabatic process  $= \Delta E = - W$
  - For an isothermal process  $= Q = + W$
  - For a cyclic process  $= Q = - W$
15. According to Hess's law, the heat of reaction depends upon
- Initial condition of reactants
  - Initial and final conditions of reactants
  - Intermediate path of the reaction
  - End conditions of reactants
16. In which case, a spontaneous reaction is possible at any temperature?
- $\Delta H - ve, \Delta S + ve$
  - $\Delta H - ve, \Delta S - ve$
  - $\Delta H + ve, \Delta S + ve$
  - In none of the cases
17. Select the incorrect statement :
- Combustion of F<sub>2</sub> is exothermic
  - Combustion of N<sub>2</sub> to N<sub>2</sub>O is endothermic
  - A good fuel have higher calorific value
  - Nutrition calorie = 10<sup>3</sup> calories or 1 cal or 1 kcal
18. The enthalpy change for the following reaction.  $NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l)$  is -57 kJ. Predict the value of the enthalpy change in the following reaction :  $Ba(OH)_2 + H_2SO_4(aq) \rightarrow BaSO_4(s) + 2H_2O(l)$
- 57 kJ
  - 76 kJ
  - 114 kJ
  - 228 kJ

19. At 27°C one mole of an ideal gas is compressed isothermally and reversible from a pressure of 2 atm to 10 atm. The value of  $\Delta E$  and  $q$  are ( $R=2$  cal)
- a) 0, -965.84 cal
  - b) -965.84 cal, -865.58 cal
  - c) +865.58 cal, -865.58 cal
  - d) +965.84 cal, +865.58 cal
20. Change in entropy is negative for:
- a) Bromine (l)  $\rightarrow$  Bromine (g)
  - b)  $C(s) + H_2O(g) \rightarrow CO(g) + H_2(g)$
  - c)  $N_2(g, 10 \text{ atm}) \rightarrow N_2(g, 1 \text{ atm})$
  - d)  $Fe(1 \text{ mol}, 400 \text{ K}) \rightarrow Fe(1 \text{ mol}, 300 \text{ K})$

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